



**START**



**MICROFILMED 1998**

**Penn State University  
Libraries**

**University Park, PA 16802-1805**

**USAIN STATE AND  
LOCAL LITERATURE  
PRESERVATION PROJECT:  
PENNSYLVANIA**

**Pattee Library**

**Funded by the**

**NATIONAL ENDOWMENT  
FOR THE HUMANITIES**

**Reproductions may not be made  
without permission from  
The Pennsylvania State University Libraries**



**Pennsylvania  
Agricultural  
Literature on  
Microfilm**

# **COPYRIGHT STATEMENT**

**The copyright law of the United States - Title 17, United States Code - concerns the making of photocopies or other reproductions of copyrighted material.**

**Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or other reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.**

**This institution reserves the right to refuse to accept a copy order if, in its judgement, fulfillment of the order would involve violation of the copyright law.**



**Master Negative  
Storage Number**

**PSt SNPaAg085**

## **CONTENTS OF REEL 85**

- 1) Pennsylvania Dairy Union  
Annual meeting of the Pennsylvania Dairy Union  
MNS# PSt SNP aAg085.1**
- 2) Mathematics for students of agriculture, 1925  
MNS# PSt SNP aAg085.2**
- 3) Mathematics for students of agriculture, 1926  
MNS# PSt SNP aAg085.3**



**Author: Pennsylvania Dairy Union**

**Title: Annual meeting of the Pennsylvania Dairy Union**

**Place of Publication: Harrisburg, Pa.**

**Copyright Date: 1904**

**Master Negative Storage Number: MNS# PSt SNP aAg085.1**

<237162> \* Form:serial Input:MCB Edit:FMD  
 008 ENT: 821019 TYP: d DT1: 19uu DT2: 19uu FRE: a LAN: eng  
 037 PSt SNPaAg085.1 \$bPreservation Office, The Pennsylvania State  
 University, Pattee Library, University Park, PA 16802-1805  
 090 10 637.06 \$bP378p \$l+(date) \$cax \$s+U1904+U1906+U1909-U1910  
 090 20 Microfilm D344 reel 85.1 \$l+(date) \$cmc+(service copy, print master,  
 archival master) \$s+U1904  
 110 2 Pennsylvania Dairy Union  
 245 10 Annual meeting of the Pennsylvania Dairy Union  
 246 1 \$i<8th (1906)>-11th (1909) have title: \$aProceedings and papers of . .  
 annual meeting of the Pennsylvania Live Stock Breeders' Association and  
 the Pennsylvania Dairy Union  
 246 1 \$i<12th>- have title: \$aProceedings of the ... annual meeting of the  
 Pennsylvania Dairy Union  
 260 [Harrisburg, Pa.] \$bWm. Stanley Ray, state printer of Pennsylvania  
 300 v. \$bill. \$c24 cm.  
 500 Meetings for <1909?-1910?> are joint meetings with the Pennsylvania  
 Live Stock Breeders' Association  
 500 Description based on: 1904  
 533 Microfilm \$m1904 \$bUniversity Park, Pa. : \$cPennsylvania State  
 University \$d1998 \$e1 microfilm reel ; 35 mm. \$f(USAIN state and local  
 literature preservation project. Pennsylvania) \$f(Pennsylvania  
 agricultural literature on microfilm)  
 590 Archival master stored at National Agricultural Library, Beltsville, MD  
 : print master stored at remote facility  
 590 This item is temporarily out of the library during the filming process.  
 If you wish to be notified when it returns, please fill out a Personal  
 Reserve slip. The slips are available in the Rare Books Room, in the  
 Microforms Room, and at the Circulation Desk  
 650 0 Dairying \$zPennsylvania \$xPeriodicals  
 650 0 Dairying \$xSocieties, etc. \$xPeriodicals  
 710 2 Pennsylvania Live Stock Breeders' Association  
 830 0 USAIN state and local literature preservation project \$pPennsylvania  
 830 0 Pennsylvania agricultural literature on microfilm

Microfilmed By:

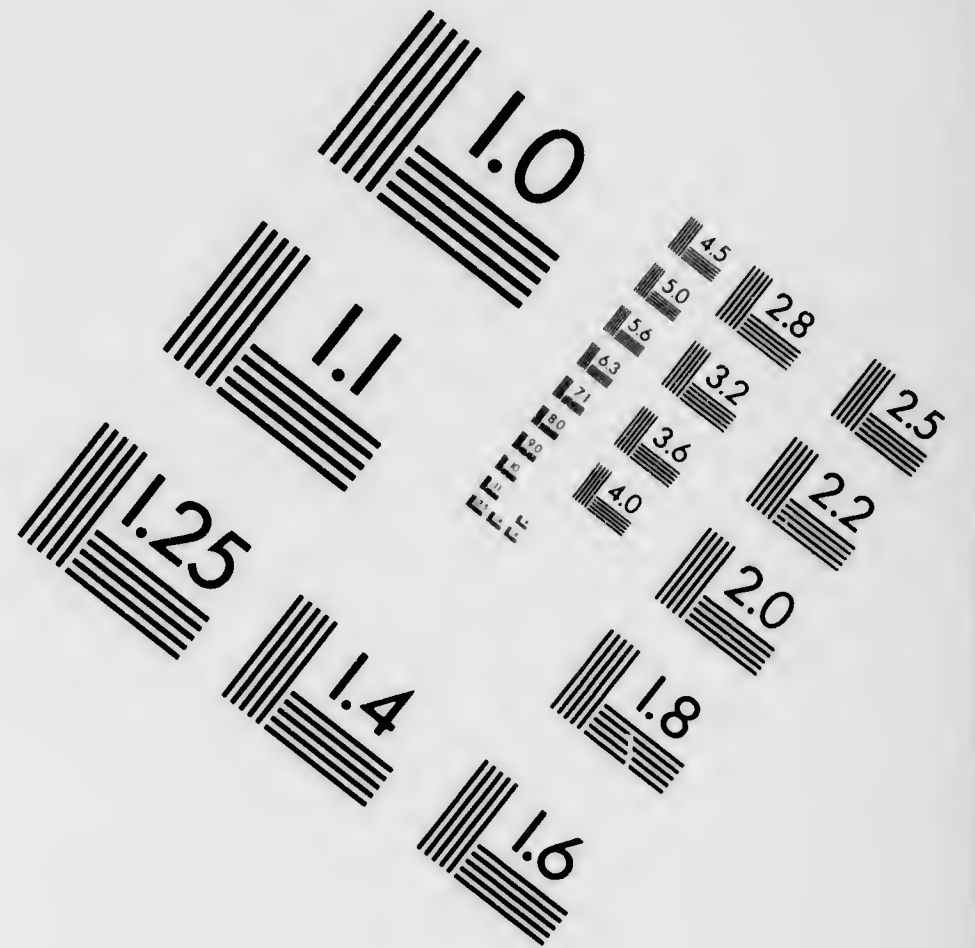
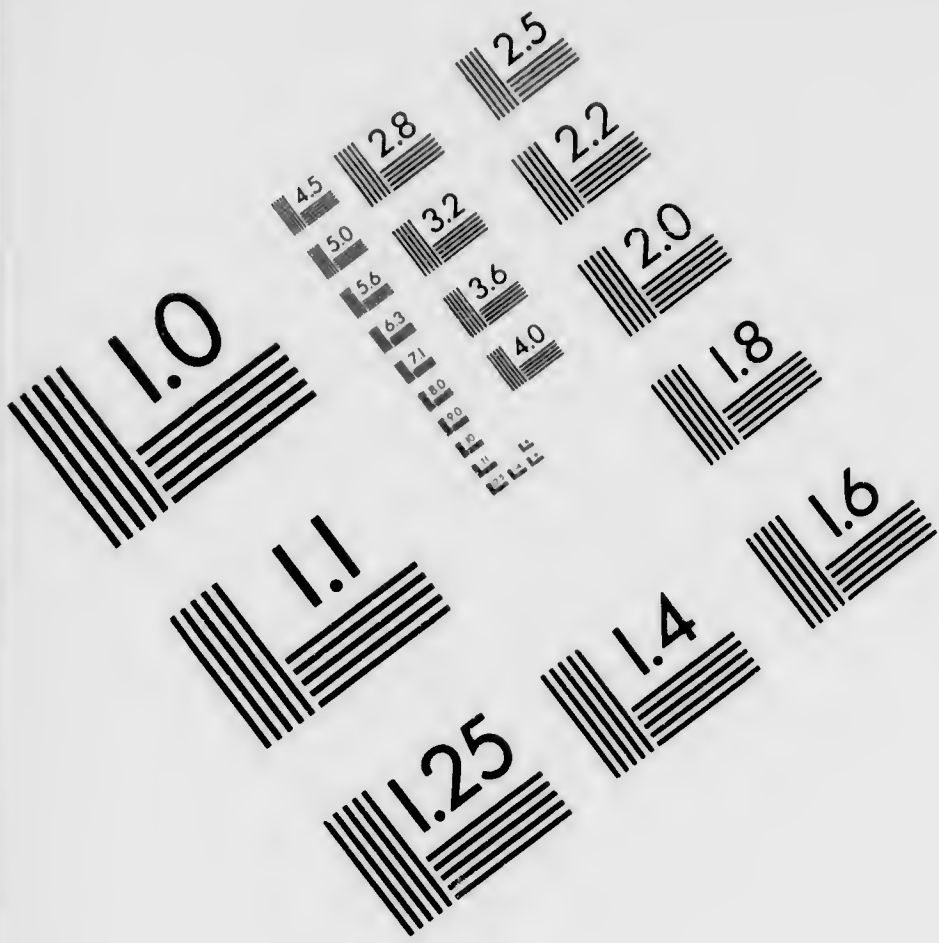
Challenge Industries  
402 E.State St  
P.O. Box 599  
Ithaca NY 14851-0599

phone (607)272-8990

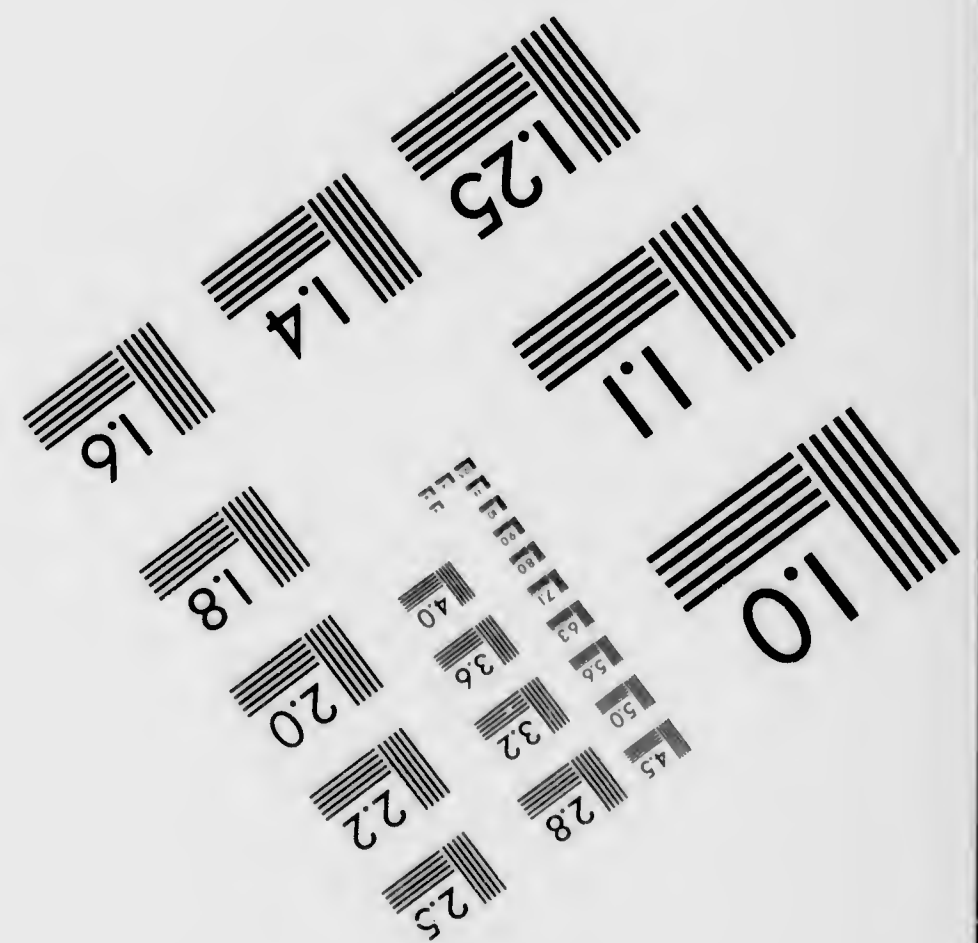
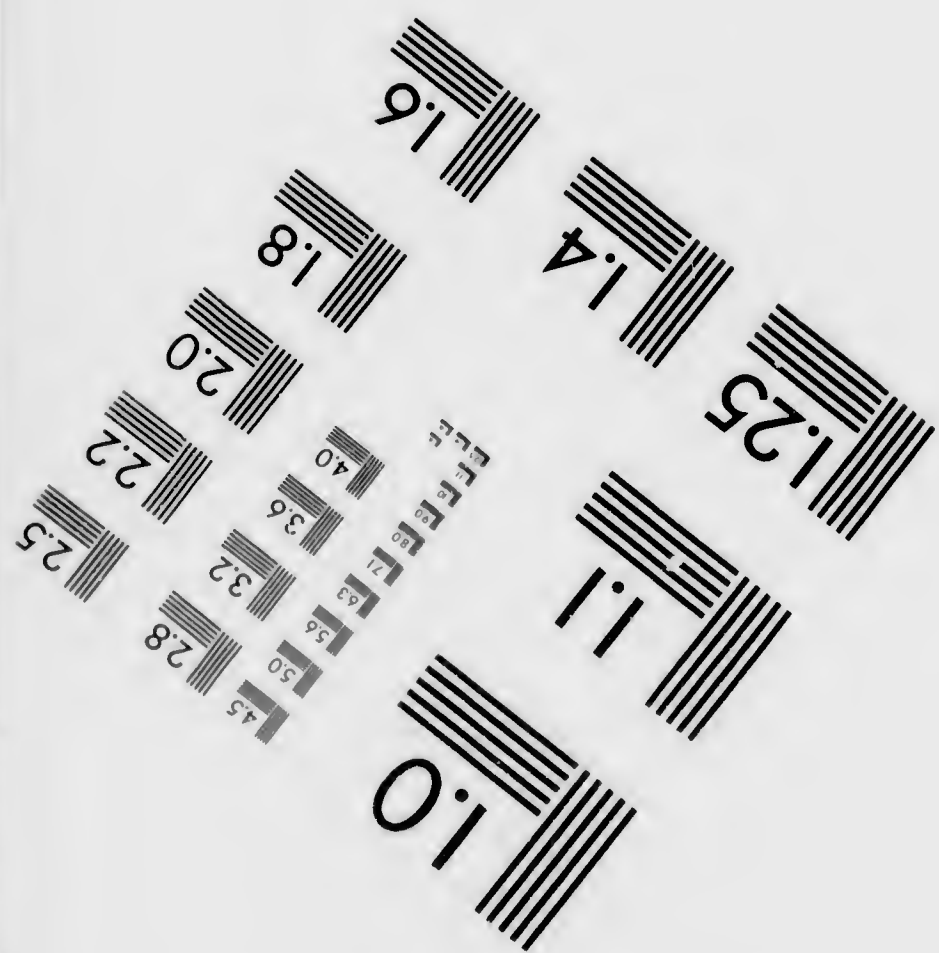
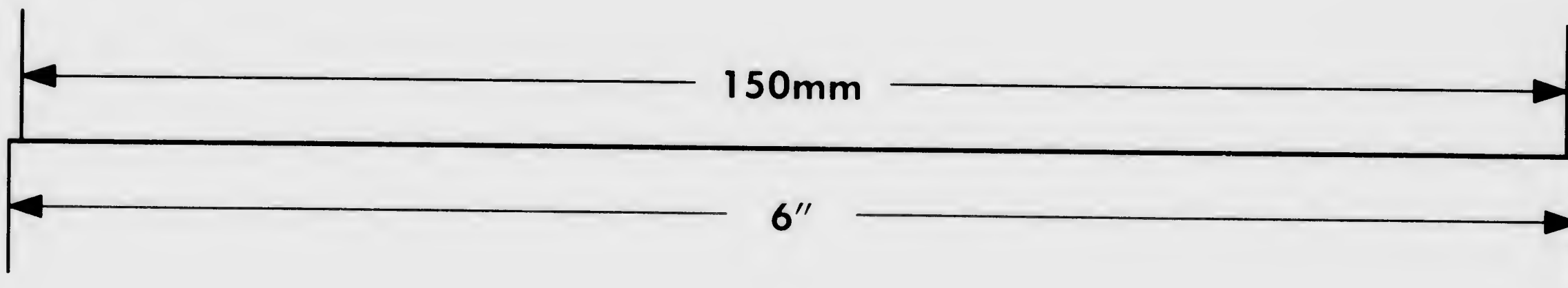
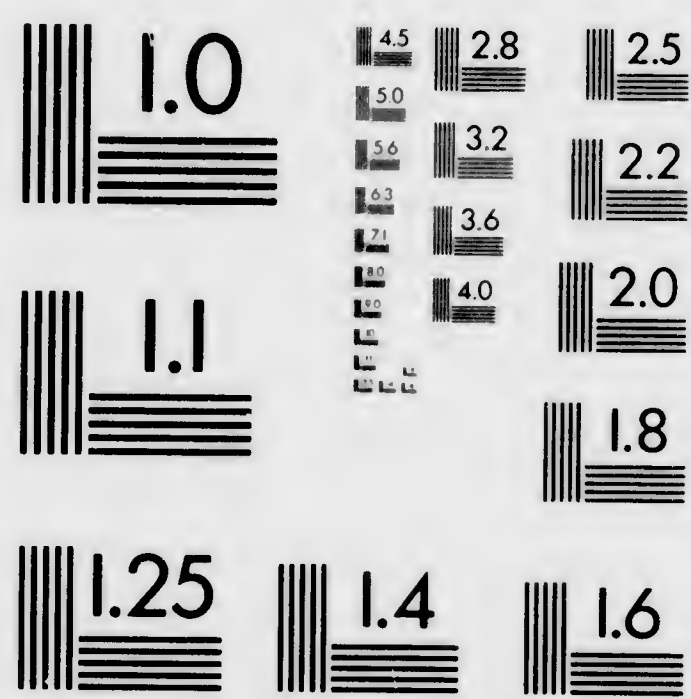
fax (607)277-7865

[www.lightlink.com/challind/micro1.htm](http://www.lightlink.com/challind/micro1.htm)





# IMAGE EVALUATION TEST TARGET QA-3



APPLIED IMAGE, Inc  
1653 East Main Street  
Rochester, NY 14609 USA  
Phone: 716/482-0300  
Fax: 716/288-5989

*Proceedings*

SIXTH ANNUAL MEETING

OF

The Pennsylvania Dairy Union,

HELD AT

HARRISBURG, PA.

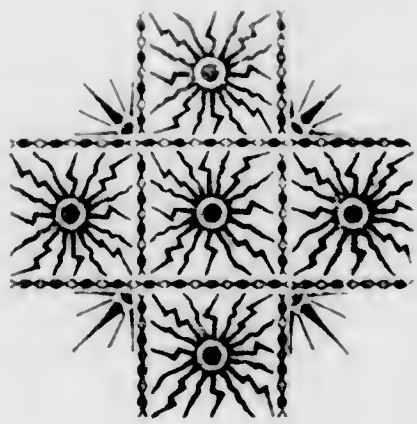
NOVEMBER 21, AND DECEMBER 1,

1904.

---

WM. STANLEY RAY,  
STATE PRINTER OF PENNSYLVANIA,  
1905.

E 637.06  
P278p  
[1904-1910]



## The Pennsylvania Dairy Union.

---

President.

Dr. H. P. ARMSBY, State College.

---

Vice President.

AUSTIN LEONARD, Troy.

---

Secretary.

W. E. PERHAM, Niagara.

---

Treasurer.

M. E. REEDER, Muncy.

---

Board of Directors.

W. C. NORTON, Aldenville.

J. H. REICHERT, Scranton.

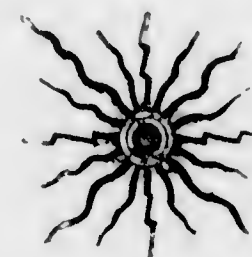
H. W. COMFORT, Fallington.

M. P. SHOEMAKER, Greensburg.

Rev. J. D. DETRICK, Frazier.

THOS. SHARPLESS, West Chester.





## THE PENNSYLVANIA DAIRY UNION.

---

The Pennsylvania Dairy Union is a voluntary organization, formed at a meeting of prominent dairymen held in Harrisburg, in January, 1897.

Its purpose may be broadly stated to be the promotion of the dairy interest of the Commonwealth in all legitimate ways. To this end, it aims so to unite and focus the sentiment of the dairymen of the State as to insure that this great industry shall receive due recognition and consideration along all the lines of progress.

In legislation, it stands for the enactment and impartial enforcement of just laws protecting and promoting dairy interest.

In education, it advocates the liberal support of all agencies which will help to make the dairyman an intelligent producer and afford him the opportunity to acquire the results of modern scientific research.

The Union holds an annual meeting at which addresses are delivered by prominent and successful dairymen of this and other states and opportunity is given for a full and free discussion of dairy and creamery problems. A report of the papers and discussions is also published and distributed free to members. An exhibition of dairy products and implements is held at the same time.

All dairymen and creamerymen and all interested in dairying are invited to become members. The dues are only \$1.00 per year.

Can you afford not to be a member? Can you afford not to do your share in advancing the interest of your business?

Application for membership, accompanied by the membership fee of \$1.00, may be addressed to the secretary.

W. E. PERHAM.

Niagara, Pa.

# THE PENNSYLVANIA DAIRY UNION,

Sixth Annual Meeting,

HARRISBURG, PENNSYLVANIA,

NOVEMBER 30, AND DECEMBER 1, 1904.

The meeting was called to order at 11 a. m. by the President,  
Professor H. P. Armsby, of State College, Pennsylvania.



## REPORT OF THE SECRETARY.

Dr. M. E. CONARD, Secretary: I have kept no formal report. The report of the last meeting is embodied in a report published by the Agricultural Department, and we also have a record from which that report was made, which will be kept as the minutes of the meeting.

As you know, last year we had a rather poorly attended meeting at Lock Haven. The dues were not very well paid and it left the finances a little low and consequently it was not thought best to publish the report in bulletin form, but only in the Department report. The previous year it was printed in bulletin form and sent out preceding the program.

At the last meeting the matter of our constitution and by-laws was discussed. Copies of them were missing and it was thought none were printed. The President, however, is quite sure that there were some printed. I have received a letter from Mr. Peck who had the organization chartered and he does not remember anything of any by-laws being made or printed and says he does not think we had such. It would seem that this is a convenient time to take up the matter of formulating a new constitution and by-laws. I have no further report to make, beyond this brief statement concerning the matter of the by-laws and constitution.



## ADDRESS.

By HON. N. B. CRITCHFIELD, *Secretary of the Department of Agriculture, Pennsylvania.*

Mr. President and Gentlemen of the Dairy Union of Pennsylvania:

I assure you that it affords me very much pleasure to meet with you for the first time. I never believe in making apologies, but I want to state before attempting to say anything else that I had entirely forgotten the fact that your Secretary had written me that he had placed my name upon the program until your treasurer called at my office this morning and said that this was the day of the meeting. I never come unexpectedly before an audience that I do not think of the experience of Paul. Among his parting words to his fellow laborer, Timothy, he said, "I am now ready to be offered;" and, as I was coming into this hall this morning, I thought I was about to be offered, and wasn't ready. That is the characteristic difference between Paul and myself. As I have already said, I am glad to meet you. I feel an interest in your work. As the head of the Department of Agriculture I naturally feel interest in all the members of the great agricultural family. In so large a State as Pennsylvania we have varied conditions of soil and of climate. We have almost every climate to be found in the United States right here in Pennsylvania. Latitude makes up for longitude, so we have not only a varied character of soils but a great variety of climate, consequently we have almost every branch of the farming industry represented in the State of Pennsylvania. I regard the dairying industry as one of the most important of the State. There was a time when the production of cereals was the leading industry of Pennsylvania, but as the great West has opened up so rapidly this has been taken away from us and we are obliged to turn our thought and attention to something else, and so we have dairies as well equipped as anywhere in the United States. With the conditions of soil and climate and the cities near by I do not see why the dairy interest is not one of still greater importance. Other States show more enthusiasm than the people of Pennsylvania, but I hope the time is not far distant when this interest will be greatly increased in Pennsylvania. The State Board of Agriculture will hold its annual meeting in this building on the 24th and 25th of next month. An arrangement has been made with Dr. Bayard, Secretary of the Pennsylvania Live Stock Breeders' Association to hold the two meetings in conjunction, and the thought has occurred to me that it would be a pretty good thing to have all these farmers' organizations go into an arrangement of the same kind and have the various meetings the same week. We would go away with a great store of useful information. Possibly it would be well for you to appoint a committee for the consideration of such an arrangement.

I thank you for your attention, and hope I may be able to meet you again before the close of your sessions; if not, you may be assured that you have the continued good will and high esteem of the

Department of Agriculture. We value your literature. The papers delivered here are valuable to the Department of Agriculture. That is the reason we are willing to make out contributions to assist in defraying your expenses. We do not feel that we are giving you anything, but paying you, and paying you at a very low rate for what you are doing.

The PRESIDENT: We are very glad to have heard the words of the Secretary of Agriculture, and personally I have been much impressed with the practical nature of suggestion which he has given us concerning the meetings. I hope the matter will be taken up before we finally adjourn.

I want to call attention to a point in the treasurer's report, namely that the Department of Agriculture last year paid considerably more than one-half the total expenses of the Dairy Union. The Secretary has shown his faith by his works.

Dr. Leonard Pearson moved the appointment of a committee to look into the matter of the Constitution and By-Laws and, if necessary, to draw up a new Constitution and By-Laws for presentation at the next meeting. Seconded and carried.

The Committee to be announced later by the President.

Mr. Norton moved the appointment of a Nominating Committee of three by the Chair. Seconded.

The PRESIDENT: The Chair would suggest that the Dairy Union in common with the other State agricultural organizations is represented upon the Executive Committee of the so-called allied agricultural associations of Pennsylvania, the present representative being Mr. S. F. Barber. Without suggesting any change, it seems to me that it would be well to bring the matter formally before the meeting of the Dairy Union that they might either renew Mr. Barber's commission, if that seems desirable, or substitute some one in his place. I am assuming that the Dairy Union being one of the organizations instrumental in bringing about this federation of the agricultural organizations will wish to be represented on the Executive Committee.

Mr. NORTON: I suggest that that be left with the Nominating Committee, the representative being considered as one of the officers.

The President announced the following Committees:

Committee on Nominations: Messrs. Norton, Sharpless and Nessly.

Committee on Constitution and By-Laws: Messrs. Pearson, Meloney and Conard.

## PRESIDENT'S ADDRESS.

Professor H. P. ARMSBY: The program seems to call for an address. I am sorry that I have not very much in the way of an address to present, partly owing to lack of time for suitable preparation. I will take, a moment, however, to call your attention to a few points which seem to me to perhaps be worthy of our consideration.

The Dairy Union represents the same tendency as is shown in other industries, the tendency to organize. The Dairy Union was



founded in an effort to unite so far as possible all the dairy interests of Pennsylvania in one organization. It represents no antagonism to other agricultural interests or to any other organization, but seeks to promote the general welfare of the Commonwealth by advancing the welfare of this particular interest which it represents in such ways as it can. In the early history of the Dairy Union the oleo question was a very prominent one and the Dairy Union took a somewhat active part in securing legislation on that subject, and I am glad to say that from the very outset it took its stand upon the impregnable ground of common honesty. Many of you will remember that the time of the formation of this association and for some years before a prohibitory State law was in force upon that subject, a prohibition which has a matter of fact, did not prohibit. The law as it then existed did not restrain the traffic in imitation butter, and this association joined with others in securing the substitution for that law of a law requiring that all substitutes for butter be sold for what they were. This law is now being enforced by the very efficient Dairy and Food Commissioner. I have said that the Dairy Union is not seeking to advance its own interest at the expense of other interests. It does not seek to make its profit upon its own products by forcing them upon other people or by taxing other products which may take the place of its own. Neither is it a partisan organization. During the years of its existence it has avoided taking any action which could be construed as political or partisan in its character. It has simply sought the honest enforcement of the Dairy and Food law and similar laws and has commended this honest enforcement wherever it has found it.

These matter, important as they are, are in my judgment a small part of the proper function of a dairy association. The older I grow, the more and more convinced I become of the utter futility of enactments to make men or people wise, or prosperous, or happy by legislation. The functions of the law are essentially negative. They are to create conditions, to insure the possibility of individual development, the conditions for prosperity, but the prosperity itself of the individual or of the community must come from individual effort and initiative; and, so while the Dairy Union should substitute equitable and just and right laws for the protection and fostering of the dairy industry, its great function is to help develop the dairyman, to make him a better man, a better citizen and a better dairyman. Unless it does this, it misses its function. This is a question of education, of fitting a man for performing his proper function in society. This leads me to speak of the place of this organization in our general system of agricultural education. Some of the other agencies for agricultural education are limited in their scope, for example, in the public schools where nature study and agriculture are introduced. Then we have the farmers' institutes, the agricultural press, the agricultural school, the college, the experiment station. Of course, none of these agencies relate directly or specifically or exclusively to dairying. The function of the Dairy Union toward these different agencies is to see that they are exercised in such a way that the dairy interests shall receive their share of consideration, that in the schools, so far as the agricultural education is concerned that the dairy side is adequately represented, that in farmers' institutes dairy subjects are properly

presented, particularly in the dairy districts. It is part of its function to support the agricultural press in its efforts to disseminate dairy information. The dairymen through their organization should see to it that dairying subjects in the agricultural school and college receive their share of attention and that the equipment of these institutions for teaching dairying are sufficient. I am glad to say that this association has done that, and that the result of their co-operation with others has been the much larger equipment of our State College for adequate instruction in dairying. The dairymen should also see that the experiment station gives adequate attention to the problems which confront it and that it has sufficient funds to do this.

In addition to this general influence there are some specific things which an organization of dairymen should accomplish. The first and perhaps the most important function is to focus the needs of those actively engaged in dairying, so that their interests can be effectively brought to bear upon educational agencies. It seems to me that the Dairy Union might wisely discuss these problems of education and public policy.

In the second place I think by the annual convention for the purpose of reading papers and comparing notes upon specific problems of dairying, much could be accomplished. This should be just as our scientific men get together annually in the great meeting of the American Association for the advancement of science and receive the stimulus of personal contact. In this way the dairymen of the State could gain a great deal of knowledge and enthusiasm by getting together once a year and learning what their neighbors are doing and thinking of.

In this connection I would emphasize the importance of the publication of the proceedings of these meetings. Even if we had the audience this morning that we ought to have, the words of the speaker can reach only a very small fraction of the dairymen of the State. The papers which we expect to hear this year and heard last year should be in the hands of every dairyman in the State. We must remember the power of printer's ink and seek to get the deliberations of these meetings before the public. I hope that before this meeting adjourns we shall take some measures toward securing some adequate support from the State for the meetings of this association and for the publication of its proceedings.

Other specific undertakings have been attempted by the dairy organizations in various regions. There should be the appointment of traveling instructors, of experts, who should be at the call of different members when they get into trouble. There should be the keeping of something like an intelligence office, keeping a record of available men for varied positions. These and other things have been attempted by organizations like our own.

For the present the two most important subjects for the success of our annual meeting are an accompanying exhibit of dairy products; and, the publication of the proceedings of these meetings, so that they can be brought to the attention of the dairymen of the State. The central idea of it all is to get together, so that the dairymen of the State will stand together and be an organized body so that they can have a voice in matters of legislation and education.



Mr. MELONEY: I think the President has put the matter before us in a very plain way. The Dairy Union school which he mentioned seems to me a very important suggestion. The dairymen of Canada have found such a project very advantageous in their work and it seems to me that something of that kind would be a great help to us and would do much toward showing dairymen their responsibilities and how their own success is dependent upon their co-operation.

Adjourned to 1.30 P. M.

Wednesday, November 31. Afternoon Session.

Dr. Leonard Pearson moved that a Committee of Three on Resolutions be appointed by the Chair to report at a later session of the meeting.

The PRESIDENT: Is it the intention of the mover of the resolution that resolutions introduced shall be referred to this committee without debate, or that it is to be a committee for formulating original resolutions.

Dr. PEARSON: I think it is customary for resolutions to be referred to such a committee, and such a committee has the right to present resolutions. Carried.

Committee appointed: Messrs. Norton, Barber and Sharpless.

## SCIENTIFIC BUSINESS.

### Improvements of Market Milk.

By PROFESSOR R. A. PEARSON, of Cornell University.

Any person who will take time to look over the recent enactments of almost any legislative body will find that a large proportion of them relate more or less directly to the public health. Such laws are becoming more and more numerous. They now cover a wide range of subjects. The practice of medicine is regulated by law because it is a profession having to do with the public health. And no one except those legislated against, will question the wisdom of laws aiming to suppress incompetent practitioners and their methods. Dentistry and pharmacy are also subjects of legislation because these professions have to do with the public health. The construction of buildings, care of the streets, disposal of sewage and many other conditions affecting the public health are governed by laws and ordinances. The legislators have given much attention to foods; and probably more to milk than any other one. Some of the reasons why milk receives special attention are that it is usually used raw and in its case, contamination will not be made harmless

by cooking as is done with most other foods; furthermore milk is of such a delicate composition that it is contaminated more easily than other foods; again, milk is used chiefly by persons who are least able to resist or overcome the effects of an unwholesome diet. These are some of the reasons why there are more laws governing milk than other foods. But if any dairyman thinks that milk is receiving an unduly large share of the law-maker's care, he should consult persons engaged in certain other occupations and he will soon find all the sympathy he wants. I do not care to argue the advantages or disadvantages of milk laws, but I wish to emphasize that these laws reflect public opinion. They are in line with the progress of the times and laws affecting the dairyman will be passed whether he wants them or not because his product is one that affects the public health.

Some dairy laws are admitted by all good dairymen to be in their interest. Such a one is the law prohibiting the sale of adulterated milk. Others are not so popular and some laws that have been passed and some that have been suggested are decidedly unpopular. Let us examine a few of the causes leading to the proposal and enactment of dairy laws: A medical authority writes that in a certain city of 500,000 inhabitants there have been 412 deaths of young infants from cholera infantum in a single year and it is pointed out that many of these young children were being fed on impure cow's milk; such statements are seen from time to time in medical papers and in the daily press. A well-known scientist finds tyrotoxicon in milk and certain milk products and it is widely published that this dangerous product of bacterial development may be due to improper methods of producing and handling milk. A student of public questions compiles lists of outbreaks of contagious diseases which were due to infected milk and he counts 195 of typhoid fever, 99 of scarlet fever and 36 of diphtheria, making a total of 330. The official report of a city milk inspector described the unsanitary conditions obtaining at some dairies supplying milk for the market. Householders sometimes find a sediment in their milk and, although this happens but seldom, they remember it long.

I do not affirm or deny any of these statements, but I say they are responsible for certain dairy laws, and certain proposed dairy laws and a certain attitude toward milk on the part of some people, that are objectionable and injurious to every one who is interested in the production and handling of milk. Although great quantities of milk are consumed amounting to an average of about a half a pint per capita per day, the demand would be greater were it not for stories like the ones cited. It is to the financial interest of dairymen to remove every excuse for public opinions unfavorable to milk and the best way of doing this is to study carefully the entire subject of milk contamination, then eliminate as many sources of contamination as possible and reduce others as far as possible.

The direct sources of milk contamination may all be considered under five heads as follows:



1. The cow.
  - a. Internal.
  - b. External.
2. Air.
3. Utensils.
4. Attendants.
5. Age.

It is impossible to tell which of these is the most serious. They are like the links of a chain.

The contamination within the cow's udder may be of an exceedingly dangerous kind if she is not in good health. Even though the cow's udder seems to be normal, if her general condition is not good, her milk should be rejected as a human food. The presence of pus cells in milk taken from inflamed udders is a form of contamination that has received much attention quite recently. We are informed that these organisms in large number render the milk most objectionable as a food. The old idea that milk is germ free so long as it remains in the udder has been disproven. Bergey reports that his investigations show that about one-third of the large number of samples of milk taken from the udder with aseptic precaution, were free from bacteria. The other two-thirds were more or less contaminated. About one-tenth of the samples contained more than 5,000 bacteria per cubic centimeter. His investigations showed that the organisms most commonly found within the udder are those associated with an inflammatory condition of the tissues. The larger part of bacteria in the udder can be avoided by discarding the fore milk. Contamination of milk from the hide and hair of the cow results in the introduction of some very objectionable forms of bacteria, including many that cause putrefactive changes in the milk and secrete products which are more or less irritating and even poisonous.

A series of carefully conducted experiments has shown that contamination of this kind can be very greatly reduced by the simple precaution of cleaning the cow's udder. This may result in avoiding about 75 per cent. of the dirt and bacteria that would fall from an udder in ordinary conditions.

The air of the stable always contains more or less small particles of dust and these carry with them bacteria. They are carried up by movements of the air due to drafts, disturbances of dry feed and bedding, etc. These particles of dust are settling like a constant shower and an open milk vessel catches a surprisingly large number of them. In a study upon this subject, Professor Fraser, of the Illinois Experiment Station, exposed more than 1,000 petri plates. He found that the number of bacteria or bacterial clusters, falling in a few seconds onto a petri plate exposed in barnyards varied from 0 to 86. Just after a shower, when the dust was settled and the air was clean, there was practically no contamination. On a dry day when the wind was moving the dust more or less, the contamination was highest. The petri plate exposed in a vacant stable showed 27 colonies while another exposed after the cows had been admitted showed 68 colonies, and the third exposed very near the floor showed 718 colonies. An exposure in two feed rooms just after bran was let down showed 418 colonies, and three minutes later only 6. In

a well kept milk room petri plates sometimes showed no contamination and at other times very little. Those exposed in the milk room averaged about 1-30 as many colonies as those exposed in another room in the same building used for ordinary purposes.

The use of the small top milk pail is the simplest way of reducing contamination of milk due to particles falling into the milk while it is being held under the cow's udder. It has been shown that 63 per cent. of the dirt is excluded by a partially covered milk pail. These figures are the more striking when they are compared with the percentage of dirt removed from milk by straining, namely only 47 per cent.

The care of dairy utensils is a more important matter than many people think. They should be washed and sterilized every time after they are used, and then they should be kept in a place as free as possible from dust. The ordinary cleaning preparations, such as Gold Dust and Pearline, have considerable value as disinfectant agents when used in the strength of 1,300 of water, as shown by Doane, of the Maryland Experiment Station. His investigations proved that these preparations in the strength named can be depended upon to kill more than 90 per cent. of the organisms on the surface of dairy utensils. But steam or hot water is the best agent for sterilizing after cleansing. Russell has shown the importance of sterilizing utensils. Even exposure of one or two minutes to live steam results in killing almost all organisms. The necessity of protecting utensils after once cleaned and sterilized is often overlooked. Bergey reports that the first milk passing through a strainer contains 60,900 bacteria per c. c., while the milk passing after 200 quarts contained only 3,350. Similar contamination results on the cooler and in a tank below the cooler, and the first milk falling from the milk bottle was found to contain 84,000 bacteria per c. c., while a sample after 200 quarts had passed through the machine contained only 4,750 bacteria per c. c.

About the same should be said regarding the cleanliness of the attendants in the dairy as the cleanliness of the cow. It is highly important to have the attendants in good health and for them to wear some special garment while milking.

Contamination of milk due to its age or storage conditions depends upon the length of time it is kept and the temperature. The importance of cooling to 50 degrees F. or lower is shown by the following figures: A sample was divided into four parts and these were held at different temperatures for 24 hours at the end of which time the number of bacteria were as stated.

|                      |                   |
|----------------------|-------------------|
| 45 degrees F., ..... | 445 colonies.     |
| 50 degrees F., ..... | 3,162 colonies.   |
| 55 degrees F., ..... | 67,170 colonies.  |
| 68 degrees F., ..... | 134,340 colonies. |

In spite of all that can be done, milk becomes more or less contaminated and the dairyman is confronted with the question as to how best to handle such milk. Filtration, centrifugalization, preservatives, high pressure, vacuum, electricity, have all been experimented with and without success. Pasteurization is recommended by many persons and undoubtedly it is a good remedy under certain



conditions, but with our ability to handle milk quickly the use of any of these measures becomes unnecessary if reasonably good care is taken to keep the milk pure when it is being drawn from the cow and before it leaves the farm.

It is impracticable for the dairyman who cannot get an extra price for his milk, to observe all the precautions that are enforced upon farmers where certified milk is produced. But the quality of most of our market milk could be greatly improved without any additional expense. Care in keeping the stable clean and free from dust at milking time, the use of a brush upon the cow and a damp cloth on her udder just before milking, the sterilization of utensils and the prompt cooling of milk, are the improvements needed upon very many dairy farms. These cost nothing except a little careful thought and they will give results which will show at once in better quality of milk and if the dairyman's business ability is not lacking they are likely to soon show also by better returns for his milk.

#### THE PRODUCTION OF CERTIFIED MILK.

BY DR. C. J. MARSHALL, Philadelphia.

Read at a meeting of the Pennsylvania Dairy Union, November 30, 1904, Harrisburg, Pa.

The progress made in dairying in the past few years has been extremely gratifying. Some of the best minds in the country have been devoted to this work. The results of these efforts are made known to us in the many books, bulletins, dairy papers, and agricultural reports written on this subject. We are constantly gaining valuable information through these various channels. There seems to be no limit to the knowledge that should be utilized in managing a dairy and its products. Preparation for this work should be made as carefully as for the ministry, law, or for the practice of medicine. After this careful preparation has been made equally as much reading and thinking should be done as is necessary for success in other callings. In all the qualifications for success there are none that are not useful in the dairy business. It requires superior workman ship to produce the best goods in any line and as dairymen we should never be satisfied until we are able to produce the best in the market.

One of the most important branches of the dairy business is in reference to producing milk and delivering it to its destination practically pure. Milk is easily contaminated and when it has become so nothing can restore it to its original purity. There is less difficulty to reason out plans for handling milk in such a way that it will not become exposed to contamination than to get these plans executed.

One of the discouragements at present is that a person who may observe the necessary precautions in handling milk may experience difficulty in making his customers believe that his precautions are

necessary or that the milk produced under these careful conditions is any more wholesome than milk handled in the ordinary way. There is another class of people who are good salesmen and by advertising and talking can convince some people that the milk handled by them has good qualities that it does not possess.

There is no small quantity of milk sold that has been handled by a plan that is far from sanitary. Some of it is spoiled and some is even dangerous to use as food. Many of the diseases of children are caused by drinking such milk. No one knows this better than the physician. It was for this reason that the Pediatric Society—a society composed of physicians who are especially interested in the diseases of children—appointed a committee a few years since to devise some plan by which a better milk supply might be obtained for the children under their care. This resulted in the establishment of the Milk Commission of the Pediatric Society of Philadelphia. This commission issues certificates to all persons who comply with its requirements. Milk handled under these conditions is known as "Certified Milk."

The rules require that three inspectors shall be employed by the Commission and paid by the dairyman. These inspectors are a veterinarian, a bacteriologist, and a chemist. They are to report to the commission at least once each month. The prices for the examinations are fixed by the commission and are at least ten dollars for each inspection made by the veterinarian, and five dollars each for the bacteriologist and chemist.

When a person desires to sell Certified Milk, he applies to the Secretary who explains to him the requirements of the Commission. If the applicant is satisfied with the conditions he signs the agreement. The veterinarian is then requested to make the inspection of the dairy. He is to report fully on the conditions as he finds them and if satisfactory to the commission, the bacteriologist and chemist are asked to make their inspection and report.

The person in charge must be above the average for ability and thoroughly interested in the subject of dairying as upon him will depend largely the success or failure of the enterprise. The cows must be healthy and free from tuberculosis as shown by the tuberculin test. Plenty of windows must be provided in the stable to allow an abundance of light. There must be some satisfactory system of ventilation in active use that will keep the atmosphere of the room free from stable odors. The gutters and drains must be sufficient to keep the cows dry and clean. The stable should be ceiled and used exclusively for cows and so constructed that it and the cows can be kept clean at all times with a reasonable amount of work.

The milk must be cooled and bottled in an atmosphere that is free from odors or dust in a room apart from the stable.

The water supplied must be pure and cool and the milk house equipped with hot and cold water, steam sterilizer and ice or cold storage.

If the veterinarian can make a favorable report on all these conditions, the bacteriologist and chemist are requested to make their inspections.



The bacteriologist determines the amount or extent of germ life in the milk as it is to be delivered to the consumer. The commission requires that it shall not exceed 10,000 germs per cubic centimetre or about sixteen drops.

Milk that is drawn in a cleanly way into an uncontaminated pail from a reasonable clean, healthy cow, in an undefiled atmosphere, that is promptly cooled, hermetically sealed and kept cool will pass this requirement. It will not be free from germs unless unusual care has been observed. For this reason pure milk is not often found. The average market milk will show about five-hundred times as many germs in a given quantity of milk as is allowed by the milk commission. Milk may contain as many as five million germs or even more in sixteen drops and to the taste, smell or naked eye, it could not be distinguished from milk that is free from germs. This fact is comparatively easy for the bacteriologist to determine. His test pretty clearly shows how much care has been exercised in handling the milk.

The normal constituents of milk is determined by the chemist. In fats and proteids 4 per cent. milk is allowed to range from 3.5 to 4.5 per cent.; 5 per cent. from 4.5 to 5.5 per cent. for fats, and from 3 per cent. to 4 per cent. for proteids. This information is valuable for the physician because in prescribing a diet for children or invalids, he often wishes to have the milk modified. Perhaps he may want milk that is richer in sugar, poorer in fats, etc., and he cannot recommend changes intelligently unless he knows nearly the normal constituents of the milk that is being used. It is also the duty of the chemist to determine whether the milk has been artificially changed or preserved in any way.

When the requirements have been fulfilled and the Commission is satisfied with the reports from the experts certificates in the form of small pointed slips are issued and given to the producer or applicant. He is entitled to one for each package of milk that is to be delivered for the next month. Before certificates are given out for the following month another favorable report must be made to the Commission by the inspectors. In case of failure to pass the test at any time a second inspection can be made. This is also done at the expense of the applicant.

It will be observed that the requirements of this Commission are very rigid and exacting. Milk cannot be produced under such careful conditions for the average prices. It will cost the producer from six to seven cents per quart to produce milk in this manner. It is not advisable to undertake it with too small a herd. The reasons are evident. It takes a person of more than an average amount of ability to manage a dairy and produce milk that will satisfy the requirements. A person with the requisite qualities can manage the work in a dairy of at least a hundred cows as easily as he could a herd of twenty. The examinations will cost no more in a large herd than in a small one. The cost of equipping the milk house will be nearly as much in a small dairy as in a large one.

Perhaps no one could devise a better plan for handling milk at the present time than is required by this Commission. The great difficulty with it is the fact that it is an expensive system, and the average consumer is not willing to pay for the extra exertion and labor. At the present time there are five dairies selling certified

milk in Philadelphia. These dairies run from thirty-five to three hundred cows. Certified milk sells in the city at from twelve to sixteen cents per quart.

There are many dairies in various parts of the country that are being managed according to these or similar high standards. They have demonstrated the fact that milk can be handled according to these requirements and kept for weeks and remain sweet. The pioneer dairies in this work are entitled to a great deal of credit. The commands from fastidious consumers, boards of health, etc., could never have accomplished these results. The ideal scholar is the one who goes to school and not the one who is sent.

Some dairies of this class are run by wealthy individuals because they have a love for this kind of work. Some of them are run at a large expense, for the owner wants the best of everything irrespective of cost.

There are also such dairies run according to these high requirements as a business proposition. The fact has not been demonstrated that such a plant can be made to pay large profits. The main reason for this is the fact that a sufficiently large market cannot be found for such milk. Consumers want rich milk and clean milk, but they do not appear to be very willing to pay for the extra effort that is necessary in order to make cleanliness reasonable sure. It will be years perhaps before the general public will appreciate the improvements that have taken place in the different departments of market milk production. No person can afford to depend upon dairying for a livelihood and handle milk, butter or cheese, according to all the known sanitary conditions and precautions, at the present time, and compete in the market with goods that are produced in the ordinary manner, unless he can command a special price. Superior workmanship and extra pains in most other callings are recognized by better pay. When the consumer recognizes the fact that it requires these qualifications to handle milk properly it is hoped he will pay accordingly for it.

By Certified Milk it is meant that milk is produced according to some definite requirements, that there is constant supervision and that there is some responsible control. A Milk Commission, if composed of the right kind of individuals, should be much more reliable and have more weight in recommending milk than can be expected of a producer, dealer, or any single individual. The Commission should be composed of the most influential men in a community or the most reliable, irrespective of their calling or profession. They should know how to produce clean milk and be constant in their requirements. If a Commission allows its requirements to become slack or gets negligent, the community will soon lose confidence. Physicians should understand better the necessity for clean milk and would naturally be the best persons, to look to for assistance. It may not every where at first be necessary to have the requirements as high as is required by the Milk Commission of the Philadelphia Pediatric Society, but this commission cannot afford to have its requirements lower. The requirements should not be so high that the majority of the people in a community cannot afford to buy such milk. Even a creamery might establish certain requirements such as could be followed by the majority of the patrons. They could arrange to buy milk from none that would not comply with



these rules. First class butter cannot be made from dirty milk and the majority of the patrons in a creamery should not be compelled to sell second class butter because a few careless people will not deliver milk that is reasonably clean.

People interested in the milk business should be honest. They have no right to advertise "Pure Milk" when it is not properly produced, "Alderney Milk" from native cattle, "Veterinary and Sanitary Inspection" where none exists or "milk from herds that are free from tuberculosis," unless the herd has recently passed the tuberculin test. A person has no right to say that a herd is free from tuberculosis because his stable is well lighted, ventilated and drained, and his pastures are on high land. A herd may be badly diseased with tuberculosis where just such conditions exist. He has no right to tell his customers that his herd is free from tuberculosis unless he has taken all known means of finding out this important fact. There are many herds where tuberculosis does not exist and it will not develop in such a herd unless it is brought into it.

In a large herd where cows are being purchased in the open market to take the place of unprofitable animals, it is very unusual to find such a herd free from tuberculosis. New cows are not in every instance free from tuberculosis even if they were tested and passed as sound at the time of sale, because the disease may be in the incubative stage when they are first tested. Such cows should be tested again in from one to two months. These cows if left in the herd for a year or more might infect a large percentage of the herd.

We hope that the time will soon come when every first class dairy in the State can produce Certified Milk and get Certified Milk prices for it.

## DISCUSSION.

Mr. GEORGE E. MELONEY: The creamerymen are much interested in the milk production. The two papers bear on the topic in relation to the milk supply of cities. I remarked to Mr. Nessley that the papers were as important to the creamerymen as to the milk dealers. I would like to know how many creamery men there are here who have formulated any rules regarding the condition of milk when it is received. Our creamery association adopted a set of rules seven years ago governing the receipt of milk and its condition at that time. To receive the milk in good condition in order to make better butter for the market is a most important thing.

Professor, JOHN W. DECKER, Ohio State University: There are two excellent papers. I have been wondering whether the shield over the opening of the bucket is really an advantage and whether it does not so close the opening that one cannot see what is going into the pail. We have at the Ohio University a pail with a cover and a small opening through it and the contamination was reduced by about one-tenth.

There is a question in my mind as to how far we should go in increasing the expense of the production of milk, and therefore, the cost of milk to the general public. There are a large number of people who are willing to pay twelve or fourteen cents per quart for milk, but we should also bear in mind the great public of working people who cannot afford to pay such prices and who should have milk to a large extent as a diet. Is there not a certain extent to which we can go and secure good milk? We are selling our milk for 12 quarts for a dollar, 8 1-3 cents per quart. We could get ten cents for it just as easily. Our milk has less than a thousand bacteria per cubic centimetre. People are coming to us because they know they can get good milk. The question in my mind is why some men do not get to work and produce good milk at a moderate price. To keep it clean and cold is all that is necessary.

Professor R. A. PEARSON: Dr. Decker has given us evidence that milk containing less than 1,000 bacteria per cubic centimeter can be profitably sold for only about eight cents per quart. The lower you yet the number of bacteria the higher you pay per capita for them.

I think the objections raised to the vizer were slight ones. If cheese cloth were used I think it is possible for boggy milk to go through it which contain a large number of pus cells. The advantage of the vizer over the cheese cloth is that there are no tag ends or damp surface to catch the dust. The milk goes in unimpeded, while the whole surface of the cheese cloth is exposed to the dust particles.

Mr. GEORGE E. MELONEY: I would like to submit to the members the rules adopted by our creamery association September 4, 1897:

## PART II.

### Rules Adopted by the Association, September 4th, 1897.

Whereas, Good butter can only be made from good milk, the following rules and conditions are necessary, and to be followed by patrons:

Section 1. Milk must be from healthy cows, fed on healthy, wholesome food, free from obnoxious weeds, garlic, etc.

Sec. 2. Cows must have pure water to drink, and free access to salt.

Sec. 3. Stables must be well ventilated, and cleaned daily.

Sec. 4. Cows must be cleaned before milking, and closed pails used for milking into.

Sec. 5. Milk must be carefully strained at once, and thoroughly cooled and aerated in pure and clean surroundings—temperature at or about sixty degrees.

Sec. 6. No milk shall stand in stables after being milked, but removed to dairy room or spring quickly as possible.

Sec. 7. Milk pails and cans must be made of best quality tin, and soldered inside and out. They must be carefully washed, scalded



and rinsed after use. All pails and cans must be washed with lukewarm water to remove the milk before scalding.

Sec. 8. Hog-slop from creamery well must not be hauled in milk cans used for supplying new milk to creamery.

Sec. 9. All milk must be delivered at creamery before 9 A. M.

Sec. 10. Any milk not in good condition when delivered to creamery will be refused. All milk will be paid for on a butter value basis, computed at actual per cent. of fat shown by the Babcock test method.

Books that Should be Read by Dairymen and Creamery Managers.

American Dairying. Gurler.

A Hand-Book for Farmers and Dairymen. F. W. Woll.

There are many other books which are well worth a perusal. The above two no dairyman can afford to be without. They present in a concise form matters of every day occurrence, and facts about the business that every man should be posted on.

Mr. RIGHTER, of Scranton: I have listened to the requirements of the Creamery Association with much interest. My experience as a dairyman is that the man who does endeavor to meet those requirements receives no more consideration from the creamery than a man who does not meet them, and all the resolutions that we could pass here as dairymen or as creamerymen would not amount to the price of the paper they were written on, unless there was a reward offered. If the Creamery Association of Pennsylvania want to make good butter, let them put a reward on good milk or a penalty on the milk not produced under these conditions and have the dairymen throughout Pennsylvania toe the mark. It is human nature to only do this when there is a reward at the other end of the line, or fear of a penalty.

The PRESIDENT: I suppose there is a good deal more danger of not saying enough on this topic than of saying too much. There is no danger of insisting to implicitly upon cleanliness in dairying, yet this question has arisen in my mind. Dr. Marshall's paper referred more particularly to milk for children and invalids, where we may assume that especially good milk is desirable. For consumption by the ordinarily healthy adult, is it a very important matter whether the milk contain one thousand or ten thousand bacteria per cubic centimetres, provided it is not pathogenic?

Dr. MARSHALL: With the amount of knowledge that we have at present it is difficult to tell whether the bacteria are pathogenic or nonpathogenic. The only way to tell is whether or not the milk makes one sick, and then it is too late. I do not think that even a child will notice the difference between two or ten thousand germs in the milk. I know, however, that the milk will keep much longer with the less number of bacteria.

The President: It seemed to me possibly that there was a little danger in emphasizing too greatly the matter of the reduction of bacteria and making the dairymen think that unless they got the bacteria count away down they might as well do nothing. I am a little afraid the tendency would be to do nothing because they could not do all.

Mr. PINCUS: How many quarts of certified milk are sold in Philadelphia, compared with the other?

Dr. MARSHALL: I cannot answer that. Possibly there are five dealers selling certified milk. Probably not one per cent. of the milk sold in Philadelphia is certified milk. The reason the Pediatric Society had for making these rules was that they wanted to be reasonably sure of some definite milk. With reasonable precautions the number of bacteria can be kept at 10,000. The milk should be kept clean and cool. It should be from healthy cows and handled generally under proper conditions.

I would like to ask Mr. Meloney what system is taken by the Creamery Association to find out whether or not the rules adopted are being followed.

Mr. MELONEY: That is the principal difficulty we had. At one time it was thought to employ an inspector and have him go around as some milk dealers have inspectors. It was particularly in regard to the original inspection that the Creamery Association was expected to work. The Babcock test was coming out and the idea was to get the creameries to set a standard. The milk was not furnished on a butter contest. The matter was not carried out as it should have been owing to the lack of interest on the part of creamery men. The most difficult point was to get co-operation. When objections were made to the milk the inspectors went to the farmer to see what the conditions were under which the milk was produced and the conditions of the herd. This improved the average quality of the milk.

Mr. SHARPLESS: I would like to ask Dr. Marshall whether certified milk can be produced on a making money basis and sold for less than 12 cents per quart.

Dr. MARSHALL: There is a great difference in the amount of money that can be made in producing certified milk. I think Mr. Pearson could answer that better than I from his experience. I think the cost is five cents a quart at the farm to produce the milk. If I should ask the dairymen here how much it cost to produce a quart of ordinary milk there might be a difference of opinion about that.

Professor DECKER: It costs us about six cents a quart to produce certified milk which would cover the cost of the milk bottle and delivering it. On the other hand, some of our labor comes higher, and some of our feed comes higher. Since we adopted this style pail the number of bacteria has been greatly reduced.



## OPPORTUNITIES IN DAIRYING FOR YOUNG MEN OF ABILITY.

By PROFESSOR JOHN W. DECKER, *Ohio State University.*

There are two things that I believe in. I believe in the dairy business and I believe in young men. If I did not believe in them my position as professor of dairying in an agricultural college would be untenable and my work a failure. My subject conceives young men. Old men have their habits fixed, and it is hard work straightening an old tree, but a young man is still plastic and has life before him. I want to assure you that it is interesting work shaping thought and action of a young man into the channels in which they will run through the years of a busy life. My subject has to do also with young men of ability. A pretty poor stick is he who has no ability. Every man has some ability though it may be of different kind or degree from that of another, so my subject is not for a limited class but is general. The extent of one's ability is measured by the keenness and definiteness of thought and the measure of this keenness and definiteness of thought is often expressed in material things. A man works on the street digging ditches. It requires a great deal of muscle, and some mental effort to dig the ditch according to directions. He gets at the rate of a dollar a day and at the end of the week gets six dollars in money. That six dollars represents stored up energy physical and mental. The money is simply a medium of exchange by which he can exchange his effort or energy for some other person's effort and money is a means of measuring the effort of different men in terms of benefit to the world. The more the world needs a certain kind of effort the greater is the money—or material value placed upon it. The man who works out by thought in his brain how the ditch should be dug, and what obstacles must be overcome in its construction, superintends the work at a less expenditure of muscle but of greater mental effort. Perhaps he gets \$12 at the end of the week. The world says that he is as valuable as two more muscular men. As we follow up this line of argument we will see that the mental effort of some men is rarer and much more prized than that of those of less mental ability.

God thought out the problem of the starry universe, and mental vigor in the human race has been measured by material prosperity. A thought originates in one's inmost soul. It may take shape in an act, the first act paves the way for a second act, the acts become habitual, habits make character and character makes destiny. The destiny of our nation is dependent upon, the thoughts, acts, character of its young men. The thoughts the young men of to-day we think will become the history of to-morrow. A young man should

cultivate right habits of thought. He should think out things clearly, accurately and to conclusions.

But how about the expenditure of one's best thought on the dairy business? Is the dairy business worth one's best efforts. If one has by inheritance and a good training rare ability will he be wasting his life in the dairy business?

The dairy business seems to be about as old as the human race, it is with us to-day and in larger proportions than ever before. Abraham, the father of the Jews was a dairyman. We do not know what breed of cows he kept, but there is no doubt of their being of the dairy type for we are told. Gen. 188 that when he had a visit from some distinguished guests "he took milk and butter, and the calf which he had dressed and set it before them." The much lauded King David has been represented as a shepherd boy but his father must have kept the sheep for dairy purposes for when David went to visit his brothers in the Hebrew army his father sent by him ten small cheese, and the cheese must have been fit for a king for King Saul was to have a share of them. All through the centuries men have been giving thought and effort to the dairy business, but the past century has shown the greatest progress for men have given it the best thought. When the colonists came from Europe they brought with them the dairy cow and she has blessed the people of America ever since. North Eastern Ohio is a very fertile country. When certain inhabitants of New England had received damage, they were indemnified by gifts of this land. The settlers brought the dairy cow. They made cheese in 1810. Enterprising young men bought up this cheese and took it to Pittsburg by teams for barter. In 1820, Harvey Baldwin, 19 years of age, started with five tons of cheese, made near Aurora, by boat for New Orleans, but sold it at Wheeling, Cincinnati and Louisville. In 1835, Chas. R. Harmon took six tons of cheese via the Lakes, to Fort Dearbin (now Chicago), but finding Indians and no demand for cheese, went back to Milwaukee, a village of 75 inhabitants and sold it. About 1852, Mr. Harmon bought cheese five days from the hoops and cured it. Then factories sprang up on the curd gathering plan. The farmers made curd of the milk and hung it up to drain in bags. The curd gathering wagon went the rounds and gathered up the curd. It also gathered up most of the flies in the county. The curd was pressed and cured at a central place.

In 1857, Jesse Williams and his sons on adjoining farms in Oneida county, N. Y., brought their milk together to be made into cheese. This is said to have been the birth of the factory system. In 1860, the first factories started in Ohio and Wisconsin. In 1870, the first creameries started on the gathered cream plan. Then a man thought out a better way of skimming milk and the world has paid a heavy premium for that thought. In 1879, a De Laval cream separator was exhibited at the London Dairy Show. The committee on awards reported that "it was a very interesting invention, but would probably not become practical in large dairies." The trouble was that the egotistical Englishmen did not have keen enough thinking machines to appreciate what the Swede had done for the world. The Swedes' thought of a generation ago has developed into very interesting history. In 1890, Dr. Babcock invented his famous milk test that has pointed out unnecessary losses. Other chemists had been at



work on the problem of a simple and efficient milk test for several years. I had the privilege of working in his laboratory as a student at the time and I saw him develop the test that other men were trying for, in about six weeks. But it took nearly fifty years of patient training to do such a work in six weeks. Dr. Babcock has greatly benefited the world and has won the gratitude of the people of more than one country. The coin of the real is on a very sound basis but it is not valuable enough to measure the appreciation of a grateful people. The legislature of Wisconsin ordered a beautiful medal struck and in the presence of notable men and fair women it was presented to the man who cast his lot as a chemist with the dairymen.

William Dempster Hoard was a Wisconsin husbandman of cows. He had cheese to sell, but the market was poor. There were four different gauges of railroad between Chicago and New York. Cheese had to be transferred and was often weeks in transit and in the hot weather its quality was greatly injured. There came in process of time a single line of track and refrigerator cars. But the freight rate on cheese was two cents a pound in box cars. Hoard went in for a rate of one-fourth cent per pound in refrigerator cars. He had to fight for it but he thought the problem through. His thought gave Wisconsin an outlet for her product. He also thought out other dairy problems. He established a newspaper in which to give an outlet for thought on dairy problems. Did he make a mistake in giving his best thought to dairying? It made him Governor of a great Commonwealth, an international reputation and many people rise up and call him blessed.

These men have worked out the problems of their day. The dairyman need not like Alexander weep because there are no more worlds to conquer, no more problems to solve. Let us look for a moment at the business in the United States. There are 18,000,000 cows in the country kept for milk. If placed in line allowing 10 feet for each animal it would require 1,574,000 to reach from New York to San Francisco. With 18,000,000 cows we can stretch 12 such lines across the continent. There are enough to go once and a half times around the earth at the Equator. The world values them at the enormous sum of \$600,000,000. Allowing one man to each cow; and other men to make up and handle the products we find that an army of 2,000,000 people spend their entire thought and energies in this line of business.

Some men are making remarkable strides, while others are making miserable failures by wasteful and shiftless, thoughtless methods. The Continental Creamery at Topeka, Kan., gathers in cream from over three states and makes a high grade of butter, which is none too good, for the United States Navy. With the opening of the Panama Canal will probably come the opening of a demand from 500,000,000 of people across the Pacific for dairy products, butter, cheese, condensed milk. With electric interurban lines, is coming an awakening of our own people to the real value of dairy products in the form of sanitary milk and cream, ice cream, butter and cheese. The thoughtful dairyman will receive his reward.

My field of labor is Ohio. The State has produced many illustrious men of which the people are justly proud, but it needs many

more good dairymen. I dislike to recite the faults of our people away from home, but we are neighbors to Pennsylvania and probably got some of our faults from over the line and the condition with which I am more familiar is probably very like that in Pennsylvania.

Ohio has 868,000 milch cows; 100,000 men are engaged in the dairy business; 77,000,000 pounds of butter is made annually in the State. Only 8,000,000 pounds of this is made in creameries under the best methods; 79,000,000 pounds is therefore made on farms, some of this is made from centrifugal separator cream and is very good. Probably 60,000,000 pounds is of very inferior quality and the money loss on quality is probably as much as 10 cents per pound, but to not over state the bad situation we will call it 5 cents. This means \$3,000,000. Then my observations indicate that one-third of the butter fat in the milk is lost in the skim milk. That means 20,000,000 pounds of butter that might have been recovered and at 20 cents per pound it would amount to \$4,000,000. Improper care, and feed of cows, waste of manure by fermentation and leaching would swell the loss—or price of ignorance—to \$10,000,000 a year. This is \$100 per man engaged in the business.

Every young man may not have the ability of a Hoard or Babcock, but there is ability in all. There is a demand for trained dairymen. I have three times as many calls each year for men as I can fill. The demand is for men who are honest, reliable, can be depended upon. Such are at a premium.

There is often a tendency for young men to take a short cut to efficiency but I want to say that efficiency is not gained by short cuts. Men take short dairy courses in the Agricultural College because they think it an easy way to get a remunerative job. It is one thing to get a job and another to hold it. The thoroughly trained reliable man will not only hold his job but has good chances for a better one. The farmer's boy who produces good milk shall have his reward.

I think it was Horace Greeley who said that every man who could make two blades of grass grow, where formerly there was but one was a benefactor to the human race.

The man who can make a cow give two pounds of butter where formerly she gave but one is also a benefactor to the human race for butter, nice fragrant golden butter has value (and therefore bad men counterfeit it) has value to make many a hard morsel go down easier. Young man there are enough poor dairymen in the country. We do not need any more, but there is abundant room for good ones, and surely merit both its reward.

Adjourned to 7.30 P. M.

Wednesday, November 31st. Evening Session.



## SOME INTERESTING FACTS ABOUT DAIRYING.

By PROFESSOR JOHN W. DECKER, *Ohio State University.*

This address was illustrated by means of a stereopticon, 91 slides being shown. The following notes were gathered from the facts presented.

### USES OF DAIRY COWS.

The purposes for which the eighteen million cows of the United States are kept are as follows:

|  | Cows.      |
|--|------------|
| Butter at 154 pounds per cow per year, .....         | 9,700,000  |
| Cheese at 358 pounds per cow per year, .....         | 800,000    |
| Condensed milk at 912 pounds per cow per year, ..... | 200,000    |
| Milk consumed at 430 gallons per cow per year, ..... | 7,412,717  |
| Total, .....   | 18,112,707 |

### DAIRY MANUFACTURING ESTABLISHMENT.

There are 5,567 butter factories; 3,585 cheese factories; 43 milk condensaries; total, 9,195 factories in the United States.

### PENNSYLVANIA DAIRYING STATISTICS.

Cows kept for milk: On farms, 943,773; in towns, 78,301; total, 1,022,074; 150 cows per 1,000 people.

They produce annually 2,922,198,330 pounds of milk or 2,860 pounds per cow.

The butter product is 111,358,246 pounds.

The cheese product is 11,124,610 pounds.

The creameries and cheese factories number 754.

### THE LEADING DAIRY STATES.

Five states have more than one million cows as follows:

|                     |           |
|---------------------|-----------|
| New York, .....     | 1,537,921 |
| Iowa, .....         | 1,479,676 |
| Illinois, .....     | 1,064,491 |
| Wisconsin, .....    | 1,032,811 |
| Pennsylvania, ..... | 1,022,074 |

### BUTTER PRODUCING STATES.

Eight states produce more than half the butter in the United States and they are situated north of the Ohio and between the Missouri and Hudson rivers as follows:

|                     |      |
|---------------------|------|
| Iowa, .....         | 9.3  |
| New York, .....     | 7.7  |
| Pennsylvania, ..... | 7.5  |
| Wisconsin, .....    | 7.1  |
| Ohio, .....         | 5.9  |
| Illinois, .....     | 5.8  |
| Minnesota, .....    | 5.5  |
| Michigan, .....     | 4.6  |
| Total, .....        | 53.4 |

### COMPOSITION OF MILK.

The composition of milk is shown by the following diagram:

|                     |                      |                    |                        |                       |                       |                     |
|---------------------|----------------------|--------------------|------------------------|-----------------------|-----------------------|---------------------|
| Water, 87 per cent. | Solids, 19 per cent. | Fat, 3.9 per cent. | Protein, 3.4 per cent. | Casein, 2.7 per cent. | Albumin, .7 per cent. | Sugar, .7 per cent. |
|                     |                      |                    |                        |                       |                       |                     |

The composition of milk and its products is as follows:

|               | Water—per cent. | Ash—per cent. | Sugar—per cent. | Protein—per cent. | Fat—per cent. |
|---------------|-----------------|---------------|-----------------|-------------------|---------------|
| Milk, .....   | 87              | .7            | 5.0             | 3.4               | 3.9           |
| Cheese, ..... | 35              | 2.0           | 1.0             | 23                | 36            |
| Butter, ..... | 12              | 5.0           | 0.0             | 1.0               | 85            |
| Whey, .....   | 94.5            | .5            | 4.0             | .7                | .3            |

### FAT GLOBULES.

The fat of milk is in the form of very small globules. They are suspended in the milk serum. Cream is a smaller part of the milk serum into which the globules have been crowded. If it is a rich cream the globules are very close together. A rich cream churns more economically than a thin cream because the globules being closer together are gathered out more completely thus giving not only a smaller amount of butter milk but a lower per cent. of fat in the butter milk.

### THE SECRETION OF MILK.

Milk is secreted in the udder from blood, blood is made from the food. The heart and lungs circulate and purify the blood. The milk veins carry venous blood from the udder to the heart and lungs. Large milk veins indicate that a large amount of blood passing through the udder enables the udder to secrete a large amount of



milk. A cow of the dairy type should therefore have a large udder, large capacity for digestive organs, large heart and lung capacity and large milk veins. The only way that the quality of milk given by a cow can be determined is by applying the Babcock fat test.

Lilly Ella, a Guernsey cow, had the ability to give a large flow of rich milk. In one year she gave over 12,000 pounds of milk containing 782 pounds of fat.

#### CONTAMINATION OF MILK.

Milk is contaminated by bacteria falling into it. A test recently made at the Ohio State University showed that in the length of time required for an average milking (ten minutes) 2,800 germs would fall into an ordinary milking pail 11½ inches in diameter, but when bright hay was thrown down a shute, dust was stirred up so that 30,000 germs would fall into the pail in the same length of time.

Columbus, Ohio, Dec. 6, 1904.

Dr. M. E. Conard, West Grove, Pa.:

Dear Sir: Inclosed find a few facts taken from my stereopticon talk at Harrisburg. It is hard to put such a talk into writing, but the facts here given may be of interest in your printed report.

Truly,

JOHN W. DECKER.

Thursday, December 1st. Morning Session.

The meeting was called to order by the President at 10 A. M.  
The consideration of the defense of the Grout Bill.

Hon. N. B. CRITCHFIELD: The news we have in the morning papers shows us the movement in Washington. I felt a great deal of chagrin when I learned that the Ways and Means Committee were preparing to submit a bill with their approval to reduce the tax on oleomargarine from ten to three cents per pound, claiming it was necessary in order to obtain the revenue. Of course, we understand exactly how it was necessary. This will change the position we must take. My apprehension is that it will be a great deal larger task to accomplish the defeat of such a bill than to prevent the repeal of the original Grout bill.

I gathered from the meeting yesterday that all was to do in opening this discussion was to tell what the Department has done. In relating that I may briefly say that sometime in the early part of October the Dairy and Food Commissioner showed me a trade journal published in New York City, I think, "The American Grocer," and called my attention to a reprint of a circular issued by the oleomargarine manufacturers of the United States setting forth a plan for the complete organization of all the people in the United States engaged in the manufacture and sale of oleomargarine, stating that

a gentleman named Russell, of Lowell, Massachusetts, had been elected chairman of the association being formed. All persons interested were requested to pay the initiation fee of \$25 and become members. The statement was made that a large amount of money would be needed to accomplish the repeal of the Grout bill. After consultation with the Dairy and Food Commissioner, we sent out a circular letter of warning not only to the people of our own State but those engaged in the manufacture of dairy products all over the United States. We had many replies, some favorable and some unfavorable. The replies from the Southern States indicate that the Southern delegations in Congress will be in favor of the repeal, because it interferes with the sale of their cotton seed oil used in the manufacture of oleomargarine. Then I found there was some apparent opposition in our own State. I have with me a letter indicating the character of this opposition under date of October 24, 1904:

Hon. N. B. Critchfield:

Dear Sir: I received the circular letter from your Department under date of October 25, 1904, in which you state that oleo manufacturers are endeavoring to obtain the repeal of the Grout bill which fixes a tax of 10 per cent. on colored oleo, and urging me to write to the Senators of Pennsylvania and Congressional representatives to use their influence against the repeal of the bill. I most respectfully protest against the Department of Agriculture of Pennsylvania endeavoring to organize such a movement as you indicate. I have absolutely no interest in oleomargarine and have quite a considerable interest in the dairy products of our State. The development of the dairy is interesting and it is most preposterous, in my judgment, that it would be affected by the manufacture of oleo with or without a tax. It is a reasonable proposition that the State should require it to be sold as oleomargarine, but to tax this, or for the Department of Agriculture to organize an attack on it, is, in my opinion, entirely unworthy of the Department. The farmers need all the experience and the advanced scientific knowledge which you can give them, but such a movement does nothing for them, but in my estimation lowers the value of your Department to the farmers generally." (Signed.)

I have replied to all the letters received, and this is the reply to this letter:

Addressing the gentleman by name, I say:

"My Dear Sir: I am just back from an absence of a week and find your letter of the 24th. I notice what you say in reference to your judgment of the effect of the action regarding the Grout bill upon the farming interests. This Department is not attempting to organize an attack upon the oleo question, but the Secretary of Agriculture and the Dairy and Food Commissioner are endeavoring to obtain a law, the policy of which will be valuable to the agricultural interests of the State. The constitutionality of the Grout bill has been upheld and it stands not alone for the dairy interests, but for the interests of the public generally. Whenever an attack upon such a law is threatened and when the persons leading such attacks



announce their purpose to use questionable means, it seems to me right that we should act and that it is our plain duty to the interests we represent.

"Very truly yours."

I read this correspondence that you may have some idea of the course taken by the persons friendly to the repeal or who will stand up for the amendment of the Grout bill. I do not know that there is anything more that I can say in this discussion. You have already taken that very important step, I am sure and that your Committee on Resolutions will report favorably upon the matter.

Possibly another thing that might be done by this meeting is to appoint a committee to frame an address to be sent to other like associations of other States of the Union calling attention to the step that you have taken and suggesting that similar action be taken by other organizations. When you have done this and when each as citizens in your individual capacity has used your personal influence upon Senators and Representatives you have perhaps done all you may be able to do with regard to this matter. I can assure you that so far as the State Department of Agriculture is concerned, that no means will be spared to do all that can be done consistent with the position that we occupy as a department of our State Government.

I thank you, Mr. Chairman, for the time.

Report of Committee on Constitution and By-Laws. In the absence of the Chairman of the Committee, this Report was made by Dr. Conard.

Dr. M. E. CONARD: In an old minute book which came into my possession with one set of minutes of 1898, we find in the back of the book a Constitution and By-Laws, without any evidence of its ever having been adopted. We also find that we are proceeding, not in accordance with these By-Laws. We have made some minor changes in them and submit them as the report of the Committee.

(The Constitution and By-Laws as found in Minute Book read by Dr. Conard.)

Mr. Norton moved the adoption of the Constitution and By-Laws as modified and reported by the Committee. Seconded and carried.

## CONSTITUTION OF THE PENNSYLVANIA DAIRY UNION.

### ARTICLE 1.

The name of this organization shall be the Pennsylvania Dairy Union.

### ARTICLE 2.

It shall be the object of this organization to promote, protect, encourage, and develop the dairy interest of the Commonwealth by every means within its power.

### ARTICLE 3.

Any person interested in dairying, whose name is approved by the membership committee, may become an active member by subscribing to the Constitution and By-Laws, and upon the payment of an annual fee of \$1.00. Any one rendering this organization noteworthy service may, by a unanimous vote at any regular meeting, be chosen an honorary member. Honorary members need pay no dues, they may participate in business, but not vote nor hold office.

### ARTICLE 4.

The officers of this organization shall consist of a president, one vice president, a secretary, a treasurer, and six directors, all of whom shall be elected by ballot at the annual meeting, and shall hold office for one year. The president, secretary and treasurer, together with the directors elected, shall constitute a board of directors.

### ARTICLE 5.

1. The president, vice president, secretary and treasurer shall perform the duties ordinarily appertaining to those offices.

2. Between the meetings of the union, the board of directors shall have the general management and control of the property and affairs of the organization, subject to the Constitution and By-Laws.

3. Four members of the board of directors shall constitute a quorum to do business.

4. The board of directors shall organize by the choice of a chairman, and a secretary, and may adopt such rules and regulations as shall seem desirable for its government and may appoint such committees from its own members or from the general membership of the Union as it shall consider desirable.

5. It shall be its further duty to decide the location and date of the annual meeting of the organization, and to make all necessary arrangements therefor.

6. No expenditure of the funds of the organization shall be made except by a majority vote at a meeting of the union, or as authorized by the board if directors and all bills shall be approved by the chairman of said board, before their payment by the treasurer.

7. The board of directors shall serve at each meeting as a committee on resolutions.

### ARTICLE 6.

Meetings shall be called by the president at such time and place as may be designated by the board of directors. There shall be at least one meeting of the Union each year.

### ARTICLE 7.

At any regularly called meeting, fifteen members shall constitute a quorum for the transaction of business, but a smaller number, not less than eight shall have the power to adjourn to another date.



## ARTICLE 8.

This constitution may be amended at any annual meeting by a two-thirds vote of active members present, provided notice of such amendment shall have been given in the call for the meeting, issued at least a month previous thereto.

The PRESIDENT: Mr. Pincus of the Baron de Hirsch School has asked for the privilege of saying a few words to the meeting, and if there is no objection we will hear him at this time.

Mr. PINCUS: I had the pleasure of speaking to this Union about three years ago at Harrisburg and outlined what we are trying to do at Woodbine. I am not here to secure pupils, but simply to ask for the assistance of the farmers of Pennsylvania in giving employment to our boys after they leave the school. We take city boys of the age of from sixteen to twenty-two and sometimes older and give them a practical education, as one of the photographs exhibited indicate. We have a dairy department where the boys learn how to milk, a creamery where they learn how to make cheese and butter and to handle sanitary milk. We have poultry and every branch of agriculture, excepting sheep and swine husbandry. After a boy has been with us a year he is obliged to spend a summer on a farm before he can return to the school to finish his studies. The farmer is benefited by having the boy at a reasonable price and the boy is benefited by having this test of the work. After they come back they have a chance to do some of the dairy work. They go out for a second summer and when they come back to us for the last training they can specialize in any branch they desire. We desire our pupils to be placed with farmers well prepared for the work. Last year we had five hundred applications and only sixty young men to send out. If a farmer is a member of an organization like this he will treat his help right. The boys are able to go for the spring work in order that the farmers may have the benefit of it.

Mr. COMFORT: I would like to ask whether the boys in his first year is really of much use to the farmer. He goes to the farmer without any agricultural training.

Mr. PINCUS: He has had one summer's and one winter's work. We give him a little idea of work. We see that he knows how to hitch up a horse and how to milk a cow and teach him a little about everything. The boys we have one year do not expect to get very much. They all expect fair treatment and small wages and when they have had three years' experience they expect more money. With three years' experience, however, they are not experts, but rather, intelligent young men and one who does not drink or smoke.

## Report of the Committee on Nominations:

President, Dr. H. P. Armsby, State College.  
Vice President, Austin Leonard, Troy.  
Secretary, Mr. W. E. Perham, Niagara.

Executive Committee: W. C. Norton, Aldenville; J. H. Richert, Womelsdorf; H. W. Comfort, Fallsington; M. E. Shoemaker, Greensburg; Thomas Sharpless, West Chester; J. D. Detrick, Flourtown.

Member of the Committee of Allied Organizations: Dr. M. E. Conard, West Grove.

Mr. H. W. COMFORT: I was in hope that the committee would respect my desire to be left off the committee. I am in entire sympathy with the work, but I have had to devote much time to other things and I am really overworked. I have not the time to give which a member of the Executive Committee should give. I would move that the report of the Nominating Committee be accepted, with my name removed, and that the Secretary cast the ballot.

Moved and seconded that the Secretary be instructed to cast the ballot for the names as presented by the Nominating Committee. Carried.

The following resolutions were presented by Hon. W. C. Norton, of the Committee on Resolutions:

Whereas, There is need of a national pure food law to prevent inter-state traffic in adulterated foods, and thus to supplement the food legislation of the several states; and

Whereas, The National Pure Food and Drug Congress, in whose membership the Pennsylvania Dairy Union was represented with many other similar organizations, framed a pure food bill expressing the views of the organizations of producers, merchants, consumers, and of food and health officials; and

Whereas, This bill was passed by the U. S. House of Representatives and favorably reported in an amended form, by the Senate Committee on Manufactures, during the first session of the present Congress.

Resolved, That the Pennsylvania Dairy Union respectfully urges the Pennsylvania members of the Senate to use every effort to secure the final passage of this bill during the present session of Congress.

Resolved, That the secretary of this Union transmit copies of these resolutions to Senators Penrose and Knox.

Resolved, That the Pennsylvania Dairy Union regards the work of the agricultural experiment stations of the United States as one of the most important agencies for advancing the interests and promoting the prosperity of dairying in common with other branches of agriculture, and that it is heartily in favor of all measures designed to increase their efficiency.

Resolved, That it hereby endorses the bill (H. R. No. 8,678) introduced in the U. S. House of Representatives by the Hon. H. C. Adams, of Wisconsin, to increase the national appropriation to agricultural experiment stations and requests the Senators and Representatives from this State to use every effort to secure its passage during the coming session of Congress.

Resolved, That the Secretary be instructed to forward a copy of these resolutions to Mr. Adams and to each Senator and Representative from Pennsylvania.



Seconded by Mr. Meloney and carried.

Resolved, That the Pennsylvania's Dairy Union hereby records its appreciation of the recognition accorded to the agricultural and dairy interests of the State by the last Legislature in the appropriation of \$100,000 to begin the erection at The Pennsylvania State College of an agricultural building, with the proviso that the total cost shall not exceed \$250,000.

Resolved, That the coming Legislature be requested and urged to provide for the immediate completion of the building by the appropriation of the remaining \$150,000, in order that all branches of agricultural education at the State College may be as well housed as is the dairy work in the portion of the building now completed.

Resolved, That this organization appreciates the work done in the past by The Pennsylvania State College for agricultural education and that it requests from the next Legislature a liberal appropriation for the maintenance of the various agricultural courses, in order that the equipment already provided may be utilized to the fullest possible extent.

Resolved, That in view of the importance of scientific investigation to the development of the dairy interests of the State, and of the fact that in the past scarcely any State aid has been given to the Agricultural Experiment Station, the Dairy Union is heartily in favor of a liberal appropriation by the State for the maintenance and enlargement of the current work of the Station.

Resolved, That the Secretary be instructed to send a copy of these resolutions to the Secretary of the Allied Agricultural Organizations, and that the Executive Committee be instructed to cooperate with that organization in securing the desired legislation.

Seconded. Carried.

Whereas, Sound knowledge concerning the causes of the diseases of animals and of effective methods for preventing such diseases is essential to the protection and development of dairying and of live stock husbandry, and

Whereas, The production and dissemination of such knowledge is a matter of large public importance, be it

Resolved, That we approve and recommend support by the State for veterinary research and education.

Seconded. Carried.

Mr. MELONEY: I would make a motion that the incoming Board of Directors be instructed to make provision for the publication as soon as possible of the Constitution and By-Laws, the proceedings of this meeting and a list of our members and distribute them among the members of the organization.

The Chair would venture to suggest that the consideration of the publication of the proceedings of the meeting will be somewhat expensive in view of our limited finances. Can the Secretary inform us of the cost of publishing the proceedings of the meeting two years ago?

The SECRETARY: The Bulletin reporting the meeting two years ago cost about \$60 for something like 3,000 copies, not including the distribution. They were of the proper weight to go for one cent. About \$75 was the cost of printing and distributing them. The Constitution and By-Laws would have to be printed at any rate which would add probably \$25, meaning an expenditure of about \$100.

Mr. MELONEY: My thought was to have the proceedings put in a paper pamphlet. I think we ought to have the material in printed form.

The PRESIDENT: There can be no doubt as to the desirability of having the proceedings printed. Might the motion not be wisely modified so that if the Board of Directors found themselves unable to meet the expenses, we might at least have the Constitution and By-Laws and the list of members.

#### RESOLUTION ON GROUT BILL.

The following resolution was seconded and passed:

Whereas, The Pennsylvania Dairy Union in annual session assembled learns with consternation that the Ways and Means Committee of the House of Representatives proposes to advocate legislation that in effect will mean the repeal of the Grout bill, and

Whereas, This suggested change in the law threatens not only the enormous dairy interests of Pennsylvania and of all other states but it threatens to evade and perpetuate the infliction of a miserable fraud upon the public, and

Whereas, The effect of the present law has been to protect honesty in manufacture and to discourage counterfeiting and to render it possible for the person who wishes to buy oleomargarine to do so without paying the price of butter for it, be it

Resolved, That we are unqualifiedly and immovably opposed to any tampering with the Grout law for we see in this effort an attempt to favor the Beef Trust and the Cotton-seed Oil Trust at the expense of the farmers and the consuming public, be it further

Resolved, That we earnestly request all of the Representatives in Congress from Pennsylvania to stand firmly for the Grout law as it is and to give no support to this movement in favor of counterfeiting and deception, be it further

Resolved, That we hereby place on record our appreciation of the support of Senator Penrose, the Agricultural and Dairy and Food Departments, the North American and others whose vigilance and efforts are aiding us in this contest, be it further

Resolved, That we authorize the President to appoint a committee of five to act with similar committee from other organizations in an effort to perpetuate the Grout law.

Mr. Norton moved that the President and Secretary prepare a resolution upon the death of Major Alvord. Referred to the Committee on Resolutions.



The President called for a meeting of the new Board of Directors immediately after the close of the session at the Commonwealth Hotel in Room 74.

Adjourned to 1.30 P. M.

## SECOND DAY. AFTERNOON SESSION.

The meeting was called to order at 1.30 by the President.

### CONDIMENTAL FOODS.

By DR. WM. FREAR, of State College.

(Read to Pennsylvania Dairy Union, December 1, 1904.)

One, entering the general store of almost any cross-roads village in the State, may see displayed in good view from the vantage point of the stove surrounded by much-whittled, well-worn benches, bright-tinted posters showing rearing horses filled to such excess with life that they can no longer tread all-fours upon the solid earth; great steers that have somewhat the form of types we know, but dimensions suggesting kinship to the elephant; and good fat hens, of gigantic size, each set upon a pyramid of hundreds of eggs.

We might suppose the merchant to be a school director oversupplied with samples of geological charts and aiming to educate the public with glimpses of palaeozoic times; or an agricultural idealist, portraying his notions of the results to which a thousand years of scientific breeding and feeding might attain. On closer examination, however, the posters are seen to respectively announce that these zoological wonders belong to the present time; that the rearing steed is old Bob, the plough-horse, after a short course of small doses of A. B. C. Condition Powder; that the fearful ox has reached his swollen size owing to the additional assimilation induced by adding a few spoonfuls of O. P. Q.'s Stock Food to his ordinary ration; and that the good fat hen has attained to such simultaneous fatness and egg-producing power by the stimulating effects of a few mouthfuls daily of X. Y. Z.'s Poultry Food.

For one it is claimed that "when added to other feeds it is a means of growing prime beef, brighter in color, wavy or marbled in texture, and with pure white fat in much less time than under the present system of feeding." For another, that "by using 25 pounds of it, a saying of as much as 250 pounds of corn will be secured."

For some of these foods it is roundly claimed that the well of all domesticated species alike thrive unwontedly when these particular brands are fed, and that, at the same time, all the ills to which such flesh is heir, are cured by the healing influences of these same foods. For others, it is declared that they are especially adapted to exercise such two-fold beneficence for but one species, while another

food mixed by the same manufacturer, is similarly adapted to some other particular species. As Dr. Winton well says, "Were the claims of the manufacturer all valid, a condimental food which would cure gapes in chickens might be expected to increase the flow of milk of cows and also to cure hog cholera."

They all possess one common character—that of a price far exceeding those of even the most valued concentrated foods, since the latter scarcely exceed two cents per pound in cost, while the former are sold at from five cents to \$1.00 per pound, and may safely be said to cost, on the average, ten times as much as the common ingredients of a grain ration.

The subject would be of small importance if such wares were but rarely passed over the counter to unusually credulous buyers; but the papers contain many advertisements of their manufacturers' claims; the rural mail-bag bears many a circular filled with glowing testimonials to the virtues of such feeds; in the grange hall, stands many a case or pailful of them; brisk, persuasive—tongued agents are crying their praises from county to county; numerous inquiries regarding them reach the Experiment Station, and the buyers, we are told, are a multitude.

It is deemed worth while, therefore, to attempt to answer three questions concerning them:

1. Of what are they composed?
2. What are their nutritive and medicinal virtues, as revealed by close observation and exact experiment?
3. How do their selling prices compare with the cost of their raw materials?

In reply to the first question, the formulas printed, in a very few cases, on the packages give some information; but the answer is chiefly obtained by consulting the analytical records of the Agricultural Experiment Stations. In the laboratories of the Stations of Connecticut, Massachusetts, Vermont, Rhode Island, New York, Virginia, Wisconsin and Pennsylvania, a large number of chemical and microscopical analyses have been made of the condition powders, stock and poultry foods now offered for sale to the American public. It is but just to all parties concerned to state that such analyses present many difficulties; so that only the chief constituents can be regarded as definitely determined, while other ingredients present in very small proportions have entirely escaped notice. It is, nevertheless, believed that the existing analyses afford a very fair knowledge of the nature of these mixtures.

In an appended table is presented a statement of the composition of nearly one hundred of these condimental foods. Among those there listed are some which are offered without the extravagance of claim with which most of them are put forth; the basis of selection has been the composition of the food, not that of the advertisement.

In the ninety-three (93) feeds for which particular ingredients are specified, the number in which each ingredient identified was found is as follows:

#### VEGETABLE MATERIALS.

- Linseed or flax-seed meal, 43.
- Wheat feed, bran or middlings, 48.
- Corn products, 32.
- Barley products, 6.



Cereals in general, 7.  
 Beans, 8.  
 Fenugreek, 39.  
 Pepper, 17.  
 Cayenne pepper, 11.  
 Mustard or hulls, and ginger, each 6.  
 Gentian, 15.  
 Rosin and rice, each 5.  
 Cotton seed meal, fennel seed and blood-root, each 4.  
 Rye, oats, meat and assafoetida, each 3.  
 Sage, bayberry bark, carob-bean, poplar bark, dried blood, turmeric, cocoa shells, billet, each twice.  
 Anise, rape, coriander and sunflower seeds, juniper berries, Elecampane, licorice, valerian and mandrake roots, walnut bark, lobelia and senna leaves, each once.

#### MINERAL MATERIALS.

Charcoal, 51.  
 Sulphur, 28.  
 Salt, 55.  
 Epsom salts, 20.  
 Glauber's salts, 17.  
 Iron oxid or carbonate, 16.  
 Calcium carbonate or oxid, 19.  
 Saltpeter, 10.  
 Sodium carbonate, copperas, alum, gypsum, ground bone, sand, black antimony, potassium chlorate, phosphate of lime, and magnesia in fewer cases.

These lists comprise 59 different substances or groups of substances, of which, however, but 14 occur in more than 9 mixtures, viz: Linseed meal, wheat and corn products, fenugreek, pepper, cayenne pepper, gentian, charcoal, sulphur, salt, Epsom and Glauber's salts, iron oxid or carbonate, calcium carbonate or oxid, and saltpeter.

These materials are used in preparations for all species. In the 35 poultry foods, 43 out of the 59 ingredients are listed. While, in these foods, the presence of large quantities of ground bone, oyster shells, cayenne pepper and Venetian red is of more common occurrence than is true of the other foods, there is, in general, no distinctive composition for the foods intended for the different species; although, as the detailed records appended will show, individual manufacturers who put up more than one brand of condimental food do make some difference in the components of these brands.

The composition of these foods as a class may be summed up thus: They are composed of common grain foods as a base, with linseed meal to increase their protein; to these are added more or less salt, purgative salts, often lime and iron compounds, charcoal and sulphur, some aromatic substance and a tonic bitter.

The second question, relative to the nutritive and medicinal values of these foods, naturally divides itself into a consideration, first, of the economic feeding value of the foods as given to healthy animals, and, second, of the curative virtues for the sick.

We may view rations to which these foods are added as spiced or seasoned foods, and consider, in the first place, what is known

concerning the tendency of spices to add to food value. From this consideration, however, common salt should be eliminated, as it is a constituent of the regular rations on every well-conducted farm.

The spices are characterized by the presence of essential oils and oleo-resins. In the human diet, their carefully regulated use is commended as promoting digestion. In most works on diet and therapeutics which I have consulted, they are declared to favor digestion; but exact and conclusive experiments have not appeared, in records accessible to me, to afford a good basis for this statement. We are all aware that they arouse a flagging appetite, give zest to eating and conduce, during that exercise, to a general sense of well-being. While we eat more food as a result, sometimes too much, it is not clear that either the ease or completeness of digestion is improved.

It is, however, known that condiments promote an increased flow of the digestive secretions during eating. Even at the mention of spiced foods, our mouths water. Gottlieb (Exp. Station Record, I, 148-9) found pepper and mustard, when introduced into the stomach, to increase the flow of pancreatic juice (the secretion of the sweet bread) three or four fold. These juices were more watery than usual, but had the same digestive properties for carbohydrates, fat and albuminoids.

L. R. von Korczynski (Exp. Sta. Record, 15, 390) found that with healthy subjects, paprika, mustard, ginger, pepper, horse-radish and onions at first increased, and then for a considerable time diminished the stomach secretion; a second period of stimulation followed.

The essential oils and oleo-resins of the species are irritant when taken in large quantity, and even in small amounts appear to cause an increased blood-flow toward the surface upon which they act. The muscular action of the stomach during digestion is also stimulated by their influence. In each case, however, the effect of the aromatic substance is but temporary, while that of tonic bitters, such as gentian, while purely local and promoting also an increase of glandular secretion, is more permanent.

It remains to consider, in this connection, whether the ingredients of these condimental foods otherwise promote assimilation or tend to keep the body in a healthful condition. Seegen, Voit and Mayer (Bulletin 45, Office of Exp. Stations, 336 and 338) studied the action of Glauber's salts in this relation and found no decided economical effects. Sulphur slightly increases the secretions in the alimentary tract, but does not appear to affect assimilation. Iron compounds are regarded by most medical authorities to be directly assimilated and to promote the abundant formation and active condition of the red blood corpuscles. The experiments of Henry in Wisconsin have shown that wood-ashes and ground bone are favorable to healthy bone formation when added to foods lacking in mineral elements, while numerous observations have shown the value of carbonate of lime as an aid to egg-shell formation by poultry kept upon a narrow range.

In each of these cases, the use of the material is, however, to supplement a ration deficient in the ordinarily recognized essentials or to aid the assimilative activities of a weak or unhealthy organism.

Let us now consider the available evidence from exact experiments with healthy animals receiving a normal food; to determine what the economic value of additions of condimental food is in such cases.



The earliest practical feeding experiments on record relating to the use of such foods were made by Lawes & Gilbert (J. Roy. Soc. Eng., 19, Part I; Rothamstead Memoirs, II). They fed three (3) pigs as much of a mash of 9 parts barley and 1 of bran, as they would eat; an equal lot was fed the foregoing mash, to each 10 parts of the barley and bran having been added 2 parts of a manufactured condimental food containing aromatic, carminative substances. At the end of four weeks, each lot had made the same gain in weight; but the lot with the condimental food required 400 pounds of food to produce 100 pounds of increase; the lot fed on the plain mash only 393 pounds. The use of the condimental food resulted in an entire loss of its cost and possibly of some of that of the other food.

Several years later, a second experiment was made in which sheep were fed upon Thorley's food, a much advertised condimental mixture of English preparation. In this experiment, 4 lots of 5 sheep each were used. Lot 1 received one-half pound linseed cake, one pound clover-hay chaff and all the swedes they would eat; Lot 2, the same except that one-half pound cottonseed cake replaced the linseed cake; while Lots 3 and 4 were fed like 1 and 2 respectively, except that one-fourth of the cake-meal was replaced by an equal weight of Thorley's food, as he recommended. The experiment lasted 28 weeks. The results may be summarized as follows:

|   | Food required to produce 100 pounds increase (live). | Per cent. of carcass in fat live-weight. |
|---|--|--|
| Without condiment:                        |  |  |
| Lot 1, .....                              | 5426.4   | 58.75                                    |
| Lot 2, .....                              | 5360.2   | 59.59                                    |
| Lot 3, .....                              | 5392.3   | 59.12                                    |
| Average, .....                            |  |  |
| With condiment:                           |  |  |
| Lot 1, .....                              | 5724.9   | 59.50                                    |
| Lot 2, .....                              | 6020.2   | 60.50                                    |
| Lot 3, .....                              |  |  |
| Average, .....                            | 5872.6   | 60.00                                    |
| Moore food required with condiment, ..... | 179.3  |  |

Furthermore, the manure from the condimental food was less valuable. The balance sheet shows a balance against the linseed lot fed with vs. without condiment, of L1, 12.6 on the food, and 2s. 10d. on the manure, total, L1, 15.4; against the cottonseed lot fed with vs. without condiment, on the food L. 1, 13.11; on the manure, 4s. 11d., total L. 1, 18.10.

The Vermont Station (R. 1894, 1501) reports a test with Nutriotine, a condimental food containing linseed meal, cereals, fenugreek, charcoal, sulphur and salt. The test was made upon seven Jersey fresh cows, each receiving 15 pounds mixed hay, 3 pounds corn, 3 pounds bran, 2 pounds oats, 2 pounds gluten meal, 1 pound malt sprouts. The experiment lasted 10 weeks; in three periods; the prescribed

daily addition of 2 tablespoonfuls of Nutriotine was made to the ration; in a fourth period, an equal quantity of linseed meal replaced the nutriotine. The results for the respective two-week periods were:

|                             | Lbs. Milk. | Lbs. Fat. |
|-----------------------------|------------|-----------|
| I. Nutriotine fed, .....    | 1554       | 84.78     |
| II. None fed, .....         | 1596       | 86.83     |
| III. Nutriotine fed, .....  | 1515       | 82.02     |
| IV. Linseed meal fed, ..... | 1531       | 82.22     |
| V. Nutriotine fed, .....    | 1449       | 78.96     |

This experiment, therefore, did not show that improvement in the quantity or quality of milk produced, which the maker claims to result from its use.

Another experiment with this food was made at the Maine Station (R. 1896, 50-1). Five Jerseys were fed liberal rations in proportion to their size; and the experiment otherwise made as in that at the Vermont Station. Dr. Woods summarizes the yields for 3 weeks without Nutriotine vs. 3 weeks with Nutriotine as follows:

|                           | Milk. Lbs. | Butter-fat. Lbs. |
|---------------------------|------------|------------------|
| Without Nutriotine, ..... | 2281       | 101              |
| With Nutriotine, .....    | 2264       | 101              |

Kennedy and Marshall at the Iowa Station (B. 66) experimented on steers followed by hogs. Eleven lots of twenty steers each were fed on trial rations for 94 days. Three lots were fed upon corn with Iowa Stock Food, International Stock Food and Standard Stock Food, respectively; for comparison, the lots fed upon corn meal and upon corn meal and gluten meal will be used.

| Lot.   | Feed. | Steers.             |  |                             |  |
|--|-------|---------------------|--|-----------------------------|--|
|  |       | Daily gain, pounds. | Cost of food per pound of gain, cents. | Total gain by pigs, pounds. | Price returned per bushel of ears consumed, dollars. |
| I. Corn (15-27 pounds); wheat straw, .....                                   |       | 2.39                | 10.71                                  | 506                         | .93  |
| V. Corn (15-24½ pounds); Buffalo gluten fed (¼-4 pounds); wheat straw, ..... |       | 2.92                | 9.34                                   | 427                         | 1.03   |
| VIII. Corn (15-24); Iowa Stock Food (1-40 to 1-10); wheat straw, .....       |       | 2.30                | 10.51                                  | 525                         | .92½   |
| IX. Corn (15-26); International Stock Food (1-40 to 1-7); wheat straw, ..... |       | 1.97                | 13.14                                  | 397                         | .72  |
| X. Corn (15-25); Standard Stock Food (1-40 to 1-7); wheat straw, .....       |       | 2.17                | 11.95                                  | 707                         | .70½   |



Plumb (Indiana B. 93) reports two experiments with pigs. In the first experiment, lasting 122 days, two lots of 4 pigs each were used. The results were:

|  | Daily gain, pounds. | Food eaten per pound gain, pounds. | Cost, per pound gain, cents. |
|--|---------------------|------------------------------------|------------------------------|
| I. Shorts and hominy feed, .....                           | 1.43                | 3.71                               | 2.6                          |
| II. Ditto plus 2.1 oz. of American Stock Food daily, ..... | 1.42                | 3.84                               | 3.0                          |

In the second experiment, two lots of 3 pigs each were fed for 12 weeks:

|   | Daily gain, pounds. | Food eaten per pound gain, pounds. | Total profit. |
|---|---------------------|------------------------------------|---------------|
| I. Corn meal and shorts, .....  | 1.5                 | 3.62                               | \$6.25        |
| II. Ditto plus 4 oz. Raub's Stock Food (5 weeks), 4 oz. Standard Stock Food, remaining 7 weeks, ..... | 1.6                 | 3.51                               | 6.98          |

G. Fingerling (Jour. Landwirtschaft, 51, 287-8; 52, 145-6) experimented upon the influence of fenugreek and fennel on the milk flow of goat and sheep, and observed differences which he attributed to the influence of these aromatics; fennel, in particular, he declared to increase both yield and richness in milk solids. He failed, however, to find any influence of fennel, fenugreek or anise upon digestibility of foods, and believes, therefore, that such condiments can not induce fattening.

In brief, the only digestion experiments, those of Fingerling, fail to show any gain from the use of the commonly employed aromatics, fenugreek, fennel and anise, in spite of their tendency to promote increased secretion of the digestive fluids.

Out of three experiments relative to the influence of condiments upon milk secretion, two exhibit no gain in flow or richness; the third set, by Fingerling, has not been described in detail, so that no critical judgment respecting the sufficiency of the experimental methods is possible.

Of five experiments relative to the influence of condiments upon meat production, only one shows any gain from their use, and in this case, the gain is entirely too small to correspond to the large claims put forth by the makers of condimental foods and condition powders.

The other four experiments, including those in which the larger numbers of animals were fed, show, on the contrary, a larger consumption of staple foods when the condimental foods were employed, but a smaller gain in weight in proportion to the food consumed; so that the effect of the condiment was to diminish the productive value of the normal ration; thus causing a net loss greater than the added cost of the condiment itself. Such effect can be readily accounted for by the fact that, beyond a certain point, increased food consumption overburdens the digestive system and there is a diminution in the proportion of the food digested.

Respecting the value of these preparations in case of disease, it is merely to be noted that well developed disease requires special treatment according to the nature of the disorder; that no man ever succeeded in producing a panacea or cure-all by compounding into a single mixture of the drugs listed among the materia medica and that the constant feeding of active medicines to healthy animals does not tend to ward off disease, but rather to set up serious disturbances. Thus Hess, Schaffer and Lang note (Exp. Station Record, 5, 818-9) that the Swiss practice of substituting  $1\frac{1}{2}$  to 2 ounces daily of Glauber's salts in lieu of common salt in the diet of cows, quickly produces catarrh of intestines and udder, mammitis, caking and bloody milk; and that the milk produced did not froth in the pail nor react readily with rennet, and tasted of the salts. Furthermore, by constant dosing, the system becomes less responsive to the stimulus of the drug, and requires increasing doses or new remedies to secure the desired reactions.

With respect to the aromatics and tonics commonly used in these mixtures, it is noteworthy that all, save pepper, cayenne pepper and gentian, are so mild in their effects that they are rarely used for medicinal purposes where pronounced disorders are to be cured. Furthermore, they form a very small part of the entire mixture and are given in too small quantities to promise any considerable remedial effect.

It will not do, however, to infer that such mixtures are never useful, even though they do not cause the healthy animal to improve in its functional activities, do not ward off disease, nor promise cure of well developed disorders. When used in sufficient quantity, they may serve to arouse a flagging appetite, secure the consumption of food when too little variety is available, or when it is inferior in quality; or stimulate a depressed system to the point of digestive activity, as cayenne rouses the adynamic stomach of the drunkard. In such cases, when salt alone has failed to correct the undesirable condition, and change of staple diet is impossible, a condimental mixture may be helpful.

Pott (Ldw. Futtermittel, 679 seq.) urges the desirability of giving to sheep fed upon too damp pastures, a salt lick composed of a mixture of salt, roasted malt, wormwood, gentian, juniper berries or fir twigs, tansy yarrow, or calamus, willow bark, etc., and also occasionally copperas. For horses, he commends a mixture of salt and juniper berries, or salt fenugreek, calamus, licorice root, anise, caraway, tansy, wormwood and gentian, besides Glauber's salts, baking soda and flowers of sulphur, in equal parts. For cows, a mixture of one part of fennel, caraway or anise seed, with small quantities of juniper berries, tansy and wormwood, one part of fenugreek and



three parts of salt. Where potato slump is fed, wood ashes and copperas according to the Russian practice. For swine, the English mixture of salt, charcoal, sulphur and coarse coal ashes.

Allusion has already been made to the value of lime phosphate and carbonate and of iron compounds in the diet of young animals and laying hens, so that further mention of such use is not necessary at this point. Some of the calf meals, too, have special virtues that justify their use at present selling prices.

In the third place, what is the cost of the raw materials of these foods as compared with their selling prices?

One poultry food analyzed by the writer could be duplicated by mixing air-slaked lime and Venetian red at a cost of not more than one cent per pound; the retail selling price was \$1.00 per pound.

The wholesale prices per pound of the drugs most frequently used in these mixtures are:

|                           | Cents.                            |
|---------------------------|-----------------------------------|
| Anise seed, German, ..... | 5 $\frac{1}{2}$ - 5 $\frac{1}{2}$ |
| Assafoetida, .....        | 19 -22                            |
| Cayenne pepper, .....     |                                   |
| Copperas, .....           | $\frac{1}{2}$                     |
| Epsom salts, .....        | 4                                 |
| Fennel, Italian, .....    | 5 - 5 $\frac{1}{2}$               |
| Fenugreek, .....          | 2 $\frac{1}{2}$ - 2 $\frac{1}{2}$ |
| Gentian, .....            | 4 - 4 $\frac{1}{2}$               |
| Ginger, African, .....    | 5 - 6                             |
| Glauber's salts, .....    | $\frac{1}{2}$                     |
| Juniper berries, .....    | 1 $\frac{1}{2}$ - 2               |
| Mustard, yellow, .....    | 2 $\frac{1}{2}$ - 4 $\frac{1}{2}$ |
| Pepper, .....             | 11 $\frac{1}{2}$ -18              |
| Sulphur, flowers, .....   | 2 1-5- 2 $\frac{1}{2}$            |

That is, a mixture composed of equal parts of cereals, linseed meal, mixed salts, sulphur and charcoal and mixed aromatics, might cost before grinding and packing, 2 $\frac{1}{2}$  cents per pound; it would be offered for sale at from 9 cents to \$1.00 per pound.

More frequently, the more expensive aromatic materials form a smaller proportion of the entire mixture. Why should one pay such extravagant prices for these haphazard mixtures of common materials?

To conclude, respecting these foods: The well do not need them, the sick need something else, the farmer can make his own condimental mixture far more cheaply than he can buy most of the market preparations.

### Components of Condimental Foods.

| Brand.   | Manufacturer.  | Ingredients.  |
|--|--|---|
| 1. Acme Stock Food, @ 10c.                                       | Acme Food Co., Chicago, Ill.                                   | Linseed meal and corn; salt (4.95 per cent.) and charcoal; a little sulphur and pepper.   |
| 2. Allen-Pfeiffer Poultry Powder, @ 32c.                         | Allen-Pfeiffer Co., .....                                      | Formula claims: Mustard, fenugreek, sage, oyster-shells and ground bone, capsicum, bayberry bark, ginger, wheat feed, corn meal, assafoetida, Glauber's salts, salt, ferrous carbonate, silica, magnesia, alumina and antimony. |
| 3. American Cattle Feeding Salts.                                | American Cattle Feeding Salts Co., No. 138-140 55th St., N. Y. | Glauber's epsom and common salt, with carbonate of soda.  |
| 4. American Spice Food, .....                                    | American Spice Food Co., Boston.                               | Chiefly corn with pepper.   |
| 5. American Triumph Horse and Cattle Food, @ 10c.                | McKenzie & Winslow, Fall River, Mass.                          | Corn, barley, a highly proteid substance, an aromatic like fenugreek, charcoal.   |
| 6. American Triumph Poultry Food, @ 10c.                         | McKenzie & Winslow, Fall River, Mass.                          | Rye, corn, barley, a material rich in protein, fenugreek.   |
| 7. Anglo-American Food for Stock, @ 18c.                         | Anglo-American Mfg. Co., Boston.                               | (Food Analysis, B. 267, New York Experiment Station.)   |
| 8. Anglo-American Poultry Food.                                  | Anglo-American Mfg. Co., Boston.                               | Wheat and rye brans, corn, a highly nitrogenous substance, charcoal and pepper.   |
| 9. Banner Poultry Food, @ 10c.                                   | Banner Food Co., Auburn, N. Y.                                 | Wheat bran and mids., linseed meal, salt, phosphate of lime, charcoal.  |
| 10. Banner Stock Food, ....                                      | Banner Food Co., Auburn, N. Y.                                 | Wheat bran and mids., oats, linseed meal, fenugreek, charcoal, salt, Epsom salts.   |
| 11. Barker's Horse and Cattle Powder, @ 25c.                     | .....  | Chiefly linseed meal, with fenugreek, charcoal, sulphur, Epsom salts and alum.  |
| 12. Barwells' Horse and Cattle Food, @ 6c.                       | Jno. W. Barwell, Waukegan, Ill.                                | Chiefly linseed meal, with other ingredients not determined.  |
| 13. Baum's Poultry Food, @ 12 $\frac{1}{2}$ c.                   | Baum's Castorine Co., Syracuse, N. Y.                          | Linseed meal, wheat feed, cayenne pepper, charcoal, sulphur, salt, Epsom salts and iron oxid.   |
| 14. Baum's Stock Food, @ 9c.                                     | Baum's Castorine Co., Syracuse, N. Y.                          | Linseed meal, charcoal, sulphur, salt, and Epsom salts.   |
| 15. Benjamin's Food for Horses and Cattle, @ 12 $\frac{1}{2}$ c. | Benjamin Food Co., Danbury, Conn.                              | Linseed meal, wheat feed and fenugreek.   |
| 16. Benjamin's Poultry Food, @ 12 $\frac{1}{2}$ c.               | Benjamin Food Co., Danbury, Conn.                              | Linseed meal, wheat feed, corn meal, cottonseed meal and mustard hulls.   |
| 17. Bigler's Poultry Compound, @ 33 1-3c.                        | Made in Springfield, Ill., ..                                  | Lime carbonate and oxid, and Venetian red.  |
| 18. Blatchford's Calf Meal.                                      | Jno. W. Barwell, Waukegan, Ill.                                | Linseed meal, sometimes cotton-seed meal, wheat feed, beans, carob bean, fenugreek.   |
| 19. Blatchford's Sugar and Flaxseed.                             | Jno. W. Barwell, Waukegan, Ill.                                | Chiefly flax seed, with beans and carob bean; gentian, anise and fenugreek claimed to be present.   |
| 20. Blue Grass Condition Powder, @ 12 $\frac{1}{2}$ c.           | .....  | Flaxseed, fenugreek, gentian, blood-root, charcoal, sulphur, salt, salt-peter, antimony, baking soda, green vitriol and Glauber's salts. (Formula printed on package.)  |
| 21. Calves' Cordial, .....                                       | .....  | Charcoal, carbonate of lime, sulphates, probably Glauber's salts, and a small amount of ordinary food stuffs.   |
| 22. Champion Horse and Cattle Food, @ 15c.                       | Champion Food Co., .....                                       | Chiefly corn, with linseed, rice, charcoal, salt and sulphates, probably Glauber's salts.   |
| 23. Chapin Poultry Powder, @ 40c.                                | Chopin Chemical Co., ....                                      | Formula same as for Allen-Pfeiffer Poultry Powder.  |
| 24. Climax Stock Food, @ 10 $\frac{1}{2}$ c.                     | L. B. Lord, Burlington, Vt.                                    | Chiefly wheat and barley, sulphur, salts and copperas.  |
| 25. Colonial Poultry Food, ..                                    | Puritan Mfg. Co., Rochester, N. Y.                             | Barley and other cereals, pepper, charcoal and salt.  |
| 26. Colonial Stock Food, @ 10-13 $\frac{1}{2}$ c.                | Puritan Mfg. Co., Rochester, N. Y.                             | Wheat, aromatic resembling fenugreek much; charcoal and salt.   |
| 27. Creasey's Poultry Food, @ 25c.                               | .....  | Poplar and walnut barks with other undetermined ingredients.  |
| 28. Dairy Calf Grower, ....                                      | .....  | Linseed meal and charcoal carbonates and salt.  |
| 29. Dow's Poultry Meal, @ 15c.                                   | J. C. Dow, Boston, Mass.,                                      | Meat, bone, salt, and oyster shells.  |
| 30. Eggine, .....  | Eggine Co., Hartford, Conn.                                    | Fine ground oyster shells with animal matter, pepper, charcoal and Epsom salts.   |
| 31. Eureka Egg Food, ....  | Jno. Breck's Sons Corporation, Boston, Mass.                   | Cereals, highly proteid material, charcoal, salt and oyster shells.   |



## Components of Condimental Foods—Continued.

| Brand.  | Manufacturer.                                 | Ingredients.   |
|---|---|--|
| 32. Eureka Poultry Mixture, @ \$1.00                    | Eureka Poultry Food Mfg. Co., East St. Louis. | Wholly mineral: Lime and calcium carbonate with Venetian red.  |
| 33. Fairfield's Blood Tonic for horse), @ 12½c.         | Fairfield Mfg. Co., Philadelphia.             | Wheat feed, an aromatic (probably fenugreek), saltpeter, salt, Epsom salts.  |
| 34. Fairfield's Blood Tonic and Milk Producer, @ 12½c.  | Fairfield Mfg. Co., Philadelphia.             | Wheat feed, aromatic (probably fenugreek), saltpeter, salt and Glauber's salts.  |
| 35. Fairfield's Hog Tonic, @ 12½c.                      | Fairfield Mfg. Co., Philadelphia.             | Wheat feed, dried blood, sulphur, a little pepper, salt, saltpeter, Glauber's salts.   |
| 36. Fairfield's Poultry Tonic, @ 12½c.                  | Fairfield Mfg. Co., Philadelphia.             | Wheat feed, dried blood, considerable pepper, sulphur, salt, saltpeter and much carbonate of lime.   |
| 37. Flagg's Poultry Food, @ 12c.                        | .....   | Corn, wheat feed pepper, salt, charcoal, Epsom salts and Venetian red.   |
| 38. Flour City Horse and Cattle Food.                   | .....   | Analysis (New York Station) shows low ash.   |
| 39. Foutz's Horse and Cattle Powder, @ 50c.             | .....   | Wheat feed and fenugreek, charcoal, sulphur, rosin and alum.   |
| 40. Dr. Hess's Stock Food, @ 7c.                        | Drs. Hess & Clark, Ashland, Ohio.             | Wheat feed, barley, assafoetida, charcoal, salt, Epsom salts, carbonate and sulphate of lime, and Venetian red.                                  |
| 41. Dr. Hess's Stock Food, @ 7c.                        | Drs. Hess & Clark, Ashland, Ohio.             | Bran, a material rich in protein, pepper and probably fenugreek, charcoal, salt, Glauber's salts, gypsum and iron.                               |
| 42. Hite's Horse and Cattle Powder, @ 25c.              | .....   | Flaxseed meal, with charcoal, rosin, salt and Epsom salts.   |
| 43. Ideal Egg Food, @ 12½c.                             | Poultry Supply Co., Boston, Mass.             | Cereals, a material high in protein, pepper, charcoal, Glauber's salts, carbonate of lime and iron.  |
| 44. International Cattle Fattener.                      | International Food Co., Minneapolis.          | Wheat feed, a bitter (probably gentian), a pungent substance (probably cayenne), charcoal and salt.  |
| 45. International Poultry Food, @ 12½c.                 | International Food Co., Minneapolis.          | Wheat feed, a bitter drug, cayenne pepper, charcoal and salt.  |
| 46. International Stock Food, @ 12½ to 20c.             | International Food Co., Minneapolis.          | Wheat feed, a bitter like gentian, cayenne pepper, charcoal and salt.  |
| 47. Jersey Tonic and Condition Powder, @ 18c.           | H. A. Esterbrook, Fitchburg, Mass.            | Wheat feed, ground herbs, pepper, Glauber's salts and Venetian red.  |
| 48. Johnson's Condition Powder, @ 15c.                  | .....   | Same formula as Blue Grass Condition Powder.   |
| 49. Kentucky Condition Powder, @ 24c.                   | .....   | Same formula as Blue Grass Condition Powder.   |
| 50. Knight's English Vegetable Food, @ 7c.              | Knight's Stock and Poultry Food Co.           | Wheat feed, rye, corn, an aromatic (probably fenugreek), charcoal and salt.  |
| 51. Knight's Poultry Food, @ 10c.                       | Knight's Stock and Poultry Food Co.           | Wheat bran, corn, a material rich in protein, an aromatic (probably fennel), salt and sand.  |
| 52. Kow Kure, @ 12½c.                                   | .....   | Wheat feed, various cereals, a substance rich in protein, pepper, fenugreek, saltpeter and iron.   |
| 53. Lee's Egg Maker, @ 12½c.                            | Geo. H. Lee & Co., Omaha, Neb.                | Linseed meal, a pungent (probably cayenne), charcoal and salt.   |
| 54. Lightning Horse, Cattle and Poultry Powders, @ 20c. | Herb Medicine Co., Springfield, O.            | Va. analysis shows much sulphur.   |
| 55. McClaren's English Horse Food.                      | McClaren, Brockton, Mass.                     | Chiefly corn, oats, wheat, rice and a bitter, probably gentian.  |
| 56. McLean's Vegetable Condition Powder, @ 25c.         | .....   | Linseed meal, with ginger, charcoal, sulphur and potassium chlorate.   |
| 57. Magic Poultry and Egg Producer, @ 12½c.             | Magic Food Co., Chattanooga and St. Louis.    | Chiefly linseed meal.  |
| 58. Magis Stock Food, @ 12½c.                           | Magic Food Co., Chattanooga and St. Louis.    | Chiefly linseed meal.  |
| 59. Manitoba Maize Feed, @ 12½c.                        | Manitoba Mills Co., Cleveland, O.             | Wheat feed, corn product, charcoal and salt.   |
| 60. Chas. Marvin Stock Feed, @ 50c.                     | .....   | Analysis by New York Station, B. 166, 267.   |
| 61. Matthews Compound Food.                             | Eastman Bros., Framingham, Mass.              | Cereals, linseed meal, and salt.   |
| 62. Medicated Meal, @ 20c.                              | F. C. Sturtevant, Hartford, Conn.             | Linseed meal, corn meal, ginger, fenugreek, a bitter drug and sulphur.   |
| 63. Montague's Horse and Cattle Powder, @ 25c.          | .....   | Chiefly linseed and corn meals, with a bitter drug, charcoal, sulphur and Epsom salts.   |
| 64. Myers' Royal Horse and Cattle Spice, @ 10 to 12½c.  | Myers', Niagara Falls, N. Y.                  | Linseed and corn meals, wheat feed, malt sprouts, mustard hulls, turmeric, cocoa shells, fenugreek and salt; sometimes rice, oat and bran meals. |

## Components of Condimental Foods—Continued.

| Brand.  | Manufacturer.   | Ingredients.  |
|---|---|---|
| 65. Myers' Royal Poultry Spice, @ 15 to 17½c.           | Myers', Niagara Falls, N. Y.                          | Like foregoing, with omission of malt sprouts and addition of cayenne pepper; rape seeds sometimes found.   |
| 66. Nutritone, @ 25c., @ 12½c.                          | Thorley Feed Co., Chicago, Ill.                       | Linseed, cottonseed and corn meals, wheat feed, fenugreek, charcoal, sulphur and salt; bean meal and millet occasionally present; sulphur sometimes omitted.  |
| 67. Orange Electric Food, @ 17c.                        | G. E. Vincent, Catskill, N. Y.                        | Corn and linseed meals, charcoal and sulphur.   |
| 68. Our Own Condition Powder, @ 25c.                    | .....   | Formula on package: Chiefly elecampane root, ax seed, fenugreek, with juniper berries, poplar bark, rosin, mustard, bran, licorice root, ginger root, gentian, coriander seed, valerian and blood roots, lobelia, mandrake root, Glauber's salts, salt, sulphur, copperas, carbonate of soda, antimony and saltpeter. |
| 69. Page's Perfected Poultry Food.                      | .....   | Contained, in one case, sunflower seed.   |
| 70. Pat's Poultry Food, @ 12½c.                         | .....   | Chiefly wheat bran and linseed meal, with fenugreek, charcoal, sulphur, Epsom salts, carbonate of soda, lime and Venetian red.  |
| 71. Pat's Stock Food, @ 12½c.                           | .....   | Chiefly linseed and cotton-seed meals, bran, fenugreek with charcoal, sulphur, salt, Epsom salts, carbonate of soda, and lime.  |
| 72. Pell's Horse and Cattle Food.                       | .....   | Chiefly wheat feed, corn-and-cob-meal with fenugreek.   |
| 73. Peel's Poultry Food, @ 12½c.                        | .....   | Chiefly wheat feed, corn, pepper, charcoal, ground bone and oyster shells.  |
| 74. Pell's Swine Food, @ 12½c.                          | .....   | Wheat feed, corn, pepper, fennel and fenugreek, with salt, Epsom salts and phosphate of lime.   |
| 75. Pepto-Stock Food, @ 12½c.                           | Banner Food Co., Auburn, N. Y.                        | Linseed meal, wheat midds., fenugreek, charcoal, salt and Glauber's salt.   |
| 76. Polk-Miller's Victory Poultry Food, @ 50c.          | .....   | Chiefly corn meal, with cayenne, a bitter drug, charcoal and sulphur.   |
| 77. Poultry-Corn, @ 25c., @ 12½c.                       | W. D. Carpenter Co., Chicago, Ill.                    | Wheat feed, gluten meal, corn meal, charcoal, salt and bone.  |
| 78. Pratt's Animal Regulator, @ 16 to 25c.              | Pratt Food Co., Philadelphia.                         | Corn meal, fenugreek, fennel, a bitter substance resembling gentian, charcoal, salt and Glauber's salts.  |
| 79. Pratt's Horse and Cattle Food, @ 7 1-3c.            | Pratt Food Co., Philadelphia.                         | Cereals, beans, fennel and salt.  |
| 80. Pratt's Poultry Food, @ 12 to 16c.                  | Pratt Food Co., Philadelphia.                         | Corn meal, wheat feed, a bitter drug, sulphur and Venetian red; in other samples, cayenne pepper, bran and rice meals and fenugreek are reported.   |
| 81. Prolific Poultry Food, @ 12½c.                      | L. B. Lord, Burlington, Vt.                           | Animal matter, linseed husks, charcoal, salt, Epsom salts, carbonate and phosphate of lime, sand.   |
| 82. Rochester Horse and Cattle Food, @ 8½ to 10c.       | Rochester Horse and Cattle Food Co., Rochester, N. Y. | Wheat feed, richly proteid material, an aromatic substance, a bitter substance, charcoal and salts.   |
| 83. Royal Stock Food, @ 6½c.                            | .....   | (Analysis: New York Station.)   |
| 84. Rust's Egg Producer, @ 12½c.                        | Wm. Rust & Sons, New Brunswick, N. J.                 | Material rich in protein, millet, pepper, bone, charcoal and oyster shells.   |
| 85. Schmidt's Horse and Cattle Powder, @ 50c.           | .....   | Linseed meal, with rosin, charcoal and sulphur, salt and Epsom salts.   |
| 86. Sheriden's Condition Powder, @ \$1.00.              | I. S. Johnson & Co., Boston, Mass.                    | Linseed meal, ginger, red pepper, charcoal and sulphur, Epsom salts, carbonate and phosphate of lime. In one case, Glauber's salts are reported.  |
| 87. Simpson Bros. Condimental Stock Food.               | Simpson Bros., Norristown, Pa.                        | Corn product, including some cob, an aromatic, charcoal, salt, Epsom salts and iron oxid.   |
| 88. Stanley's Condition Powder, @ 6c.                   | J. J. Stanley, Lawrence, Mass.                        | Wheat and corn, fenugreek and salt.   |
| 89. Thedford's Black Draught Stock and Medicine, @ 50c. | .....   | Chiefly linseed meal, senna leaves, fenugreek, a bitter drug, rosin, sulphur and salt.  |
| 90. Thorley's Horse and Cattle Food.                    | Thorley Food Co., Chicago, Ill.                       | Chiefly rice and linseed, with brans, fenugreek and salt.   |
| 91. Triplex Poultry Food, @ 12 to 17c.                  | Triplex Food Co., New Brunswick, N. J.                | Linseed meal, wheat feed, corn, pepper, charcoal and sulphur, ground bone, Glauber's salts, calcium carbonate and Venetian red.   |



## Components of Condimental Foods—Continued.

| Brand.                                | Manufacturer.                           | Ingredients.  |
|---------------------------------------|---|---|
| 92. Triplex Stock Food,....           | Triplex Food Co., New Brunswick, N. J.  | (Analysis: New York Station; 15.31 protein.)  |
| 93. Twentieth Century Stock Food.     | I-Heal You Remedy Co.,...               | Linseed meal, corn meal, fennel, sulphur, salt, saltpeter, Epsom salts, and lime phosphate. Makers claim several additional condiments and drugs. |
| 94. Weston's Condition powder, @ 16c. | J. W. Weston, New York City.            | Wheat, corn, bran and linseed meals with fenugreek.   |
| 95. White's Stock Food, ...           | White Food Co., Tauton, Mass.           | Chiefly wheat feed with fenugreek and salt.   |
| 96. Wilbur's Egg Food, @ 11 1-10c.    | Wilbur's Seed Meal Co., Milwaukee, Wis. | Chiefly wheat feed.   |
| 97. Wilbur's Hog Food,....            | Wilbur's Seed Meal Co., Milwaukee, Wis. | Linseed meal, wheat feed, various seeds, fenugreek, charcoal, salt, Epsom salts, lime phosphate.  |
| 98. Wilbur's Stock Food,...           | Wilbur's Seed Meal Co., Milwaukee, Wis. | Wheat bran, linseed, fenugreek, charcoal and salt.  |
| 99. Wilbur's Seed Meal, ..            | Wilbur's Seed Meal Co., Milwaukee, Wis. | (Analysis by New York Station; 20 per cent. protein.)   |
| 100. Wright's Horse and Cattle Food.  | .....                                   | Linseed meal, cereals, fine seeds, pepper, charcoal, and sulphur, Epsom salts and carbonates.   |

## THE RELATION OF THE VETERINARY SCIENCES TO DAIRY PROGRESS.

By DR. LEONARD PEARSON, *State Veterinarian.*

The veterinarian sciences include not only the study of diseases of domestic animals, but also the study of their function of production and of utilization. If we consider the bearings of these subjects, it must be apparent that the veterinary sciences have a direct relation to dairying and all branches of animal husbandry. The medical side of the veterinary sciences has received most of the attention that has been given to this general subject. There were times when the rearing of animals was absolutely impossible on account of the recurrence of animal plagues. Within a hundred years it was customary for farmers in the older countries to expect an invasion of the foot and mouth disease every few years. These recurrences wiped out the animals that had been improved by the exercise of judgment and skill and rendered improvement by breeding almost impossible. It is true that all of our improved breeds of cattle have been developed to their present stage of perfection since the infectious diseases of cattle have been controlled. It is not necessary to refer to former times to find instances of the loss caused by such diseases. If we turn to South Africa we see illustrations of the depression resulting from contagious pleuro-pneumonia wiping out the animals brought from Europe and making it impossible to improve the breed of animals. This disease was finally gotten under control and then came rinderpest sweeping like a fire across the country and wiping out these valuable animals gathered together with such tremendous labor. Now they have rinderpest partly under control and are being confronted by worst diseases, so it is that in South Africa agriculture is not merely stationary but is going backward. The settlers in Australia started out to make their country a great beef producing land and dairy country. Contagious pleuro-pneumonia came and as a result Australia imported beef. I know there are men present who remember the losses that came to Pennsylvania and the Eastern States during an invasion of contagious pleuro-pneumonia twenty or thirty years ago. This disease was imported and spread to Massachusetts, New Jersey, New York, Pennsylvania, Ohio, Kentucky, Illinois and Missouri and sweeping the great cattle sections of the west caused losses conservatively estimated as between forty and fifty millions of dollars. Then the Bureau of Animal Industry took the matter in hand and the disease was exterminated root and branch and for twelve years there was not a single case of contagious pleuro-pneumonia in the United States. This work was done at a cost of about a million dollars. This is an illustration of what may be accomplished when the work is thoroughly organized and efficiently conducted.



Two years ago there was an outbreak of contagious foot and mouth disease in the vicinity of Boston. This outbreak, covering a limited district, caused a loss of a thousand dollars a day for several months. This was also taken in hand by the Federal Government and exterminated at a cost of half a million dollars.

Others will remember the losses so common in Pennsylvania from invasions of Texas fever and some will recall that last year we had an illustration of what may happen from this source. Cattle coming from the South brought the cattle ticks from which new ticks were developed and these attached themselves to the cattle in pastures. In this way the cattle were infected with Texas fever and practically all of our United States cattle died. Last year there was a great load of southern steers brought into the stockyards at Lancaster. They were there but forty-eight hours and then were sent to Reading to be killed. Unfortunately, they were not placed in quarantine pens as required by the United States Department of Agriculture and other cattle became infected with the tick and in turn communicated the disease to others, resulting in about 300 deaths. This is a small thing compared to the occurrence of twelve or twenty years ago when in Pennsylvania thousands and thousands of cattle perished. With one exception there has been no Texas fever in Pennsylvania for eight years.

Aside from these rapidly spreading infections that always cause a great deal of alarm and terror there are smaller infections which claim less attention, but cause equally great losses. Among these is hog cholera the loss from which amounted to fifteen million dollars in one year in the State of Iowa. It causes a loss yearly of from fifty to sixty million dollars. This, I need hardly say, is a serious drain upon our resources. If the trouble were checked it would add very materially to the progress of the country.

Then there is tuberculosis. This is a subject so much discussed that it is hardly necessary to go into it in detail. Every man here probably knows of herds that have been weakened and exterminated by tuberculosis. About two weeks ago I was consulted in regard to a herd of eighteen cattle, founded twenty-five years ago without regard to expense. When the herd was established there were placed in it imported cows costing as much as a thousand dollars apiece. The herd has taken high rank in competitive exhibits in large State fairs. This herd became infected with tuberculosis by the accidental purchase of a tubercular animal a number of years ago. Tuberculosis was known to exist, but it thought it could be gotten rid of by mild measures. A cow when suspected to be tuberculous was taken away and afterwards killed. Unfortunately in this disease an animal may be infected sufficiently to spread the disease without showing well marked symptoms. As an illustration of this I might refer to an instance two years ago at the Live Stock Show in Chicago, when there was a class of about thirty fat steers and individual bullocks competing for fat steers. They were the best individual bullocks in this country that year. Among them from Ohio was "Best on Earth," a steer which had taken many first prizes and in this very hot competition in Chicago he succeeded in winning second prize. Afterwards there was a block test and the winners were killed, and it was found that this steer was riddled

with tuberculosis. I mention this to show the care that must be exercised if tuberculosis is to be got out of herds.

The herd to which I have referred was built up with much care but became infected with tuberculosis. Effective measures were not taken and during the summer four cows died of tuberculosis. They became so much run down that they were killed in order to save their lives, as it were. The owner was advised to keep some of the cattle for the purpose of rearing calves and saving the blood lines but he didn't care to do that. The animals were killed and the extent of the disease was everywhere most astonishing. Some of them showed the disease during life. A number were in run down condition. Others were in perfect health apparently, but all were infected with tuberculosis. The owner is going to start another herd and keep it free from tuberculosis. Many hundreds of breeders have lost their interest in herds on account of this insidious disease. There can be no doubt that the annual loss from this disease amounts to several million.

Anthrax has also caused enormous losses. There are farms in this State where the rearing of cattle is impossible without vaccination.

The most brilliant illustration of the relation of veterinary sciences to dairy progress is in connection with the prevention and treatment of milk fever. This is a disease of the best dairy cows and an inspection of the books of famous herds of the Jerseys, Holsteins and Guernseys would show a large proportion of these cows dead of milk fever. The loss has not been merely the loss of the animals but of the blood lines.

There is also the danger of impoverishing cows. The best that is in a cow sometimes cannot be brought out for fear of the danger of milk fever. The cows are allowed to get into a low state before calving. Through the studies of a Danish investigator a cure has been found for this disease, and one which is successful in about ninety-eight per cent, of the cases. The mortality of this disease a few years ago was as high as 50 to 75 per cent.

Another disease is calf cholera. I have known of this disease to occur in herds of imported cattle where almost the entire calf crop for the first year was lost. It is an infectious disease and one which may be guarded against.

Another disease of dairy cattle not yet controlled in this country is contagious abortion. I was much interested in learning of the investigations of Professor Barrington, of Copenhagen. He is ready to fight this disease by vaccination. He has discovered that contagious abortion is due to a germ which may be introduced into the body in a variety of ways. He has found that feeding this organism to a pregnant cow will often lead to abortion. It is less virulent when injected beneath the skin than when fed. It is a fact that has been observed not only in relation to infectious abortion but in relation to fowl tuberculosis. A chicken may be infected with tuberculosis very easily by feeding it with a small culture of the macillus of tuberculosis. By injecting an equal amount beneath the skin the fowl is not injured. The injection of the germ beneath the skin has the effect of increasing the resistance of the animal to the action of the same germ taken in by the mouth. This investigator is experimenting with the vaccination of cows against this disease and he is encouraged to believe that his results will be satisfactory.



The value of the live stock of this country approximates three billion, six hundred million dollars, and it is astonishing that so little attention is paid to the study of the diseases of animals. Nearly all of the veterinary schools in the United States have small equipments and the support is generally from private sources. It is a sad reflection upon this country that practically all the advances in our knowledge of the diseases of animals have come from foreign sources. We have profited enormously from these sources, but we have contributed little to the sum total of veterinary knowledge. In this respect we have been leading a parasitic existence. We have been drawing upon the store of knowledge generated in other countries. The appreciation of the knowledge of the veterinary sciences in European countries is shown by the way in which the veterinary schools are supported. In Switzerland there are two well equipped veterinary schools, both far better than the schools in this country. The veterinary schools in Denmark and in Holland are far better than the best in the United States. The one in Belgium is one of the best in the world. In the larger countries the work is in proportion to the size of the land. In Germany there are seven large well equipped veterinary schools. I hope the time will come when it will be possible to do more work and better work in this country in connection with diseases of animals and that we may be able to induce more students to take up the practice of veterinary medicine. What we are doing is done well so far as it goes. It does not go far enough and the country would profit largely if it were possible for it to go farther.

Mr. HERR: I would like to ask what treatment is best to prevent milk fever? In our form of feeding we take off some carbohydrates but still feed pretty strong rations and use a certain percentage of laxatives, a little ground flaxseed or Epsom salts. It has been our experience, that prevention is three-fourths of the battle.

Dr. PEARSON: Now that there is almost a certain cure for milk fever less care is taken in precautions before calving than has heretofore been thought necessary. I know of some herds in which the possibility of milk fever is not considered. If it does develop it is treated until cured. The principle of the care of the cow before calving is to diminish the flow of the milk, giving less nutritious food by giving a purge and by feeding anything that diminishes the activity of the udder.

Mr. HERR: When milk is expensive on account of the sale or manufacture of it, and you cannot give the calves as much whole milk as you would like, what would you use as a substitute?

Dr. PEARSON: Some years ago some work was done by Professor Hayward in arranging a substitute for whole milk. I have used it and found it very satisfactory, but it is a little difficult to get the ingredients and difficult now to get the cocoa meal, because the only manufacturer in Philadelphia has gone out of business. When milk is skimmed it is necessary to add carbohydrates. These may be added in starch or in any of the cereals. Generally there is danger of the skimmed milk not being in good condition; it should be used as fresh as possible and should be Pasteurized.

To check diarrhoea dried blood has been used with great success. A heaping teaspoonful with each feeding generally stops the diarrhoea.

Mr. PINCUS: I would like to ask Dr. Pearson whether vaccination is effective against contagious abortion if the disease is conveyed by contact?

Dr. PEARSON: The studies upon vaccination against contagious abortion are not yet fully developed, but it is supposed that the vaccination will be effective against the disease from whatever source it is obtained.

The President announced the following Committee . . . operate with similar committees of other organizations in support of the Grout bill:

The Hon. W. C. Norton, Aldenville, Pa.  
Mr. H. W. Comfort, Fallsington, Pa.  
Dr. M. E. Conard, West Grove, Pa.  
Mr. George E. Meoney, 1937 Market street, Philadelphia.  
Mr. S. F. Barber, Harrisburg, Pa.

The Committee on Resolutions made the following report concerning the death of Major Henry E. Alvord:

Whereas, The Pennsylvania Dairy Union learns with profound regret of the sudden death at St. Louis on . . . of Major Henry E. Alvord, Chief of the Dairy Division of the United States Department of Agriculture. As a soldier, a teacher of agriculture, an executive in several agricultural colleges, and as chairman of the Executive Committee and President of the Association of Agricultural Colleges and Experiment Stations he leaves behind him an enviable record of public service.

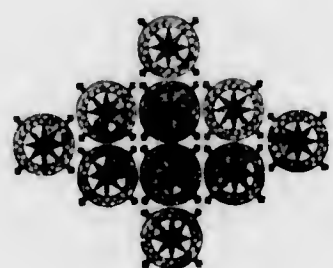
Resolved, That the dairymen of Pennsylvania desire especially at this time to place on record their appreciation of his life-long interest in and services to the dairy interests of the country, and in particular of his efficient work in the organization and administration of the Dairy Division of the Department of Agriculture, and their feeling of personal loss in the death of one who on many occasions in the past has lent the aid of his presence and voice in their meetings.

Resolved, That the Secretary is therefore hereby instructed to enter these resolutions in full upon the minutes of the Dairy Union and to transmit a copy of the same to the widow of the deceased.

The President, Professor H. P. ARMSBY: I wish to thank all those who have been here for their attendance and interest, and to express the hope that each member of the association who has been here will bring at least one with him for the next meeting. We shall hope to have a larger meeting and trust we may be able to arrange a time more satisfactory in general to the members of the Dairy Union.

Adjourned.







**End of  
Title**



**End of  
Title**







**END OF REEL**  
**PLEASE**  
**REWIND**



